A MILLION PEOPLE LIVE IN TELEPHONE CITY

775,000 SECURITY OWNERS

Only five cities in the United States have populations exceeding the number of security holders and employees of the Bell System. There is one security holder for every 165 people in this country.

More than half are women. No individual or organization owns as much as 1% of the stock of the A. T. & T.

315,000 EMPLOYEES

Anywhere you go in this country you will find an owner of Bell System securities or a Bell telephone employee. The average length of service of Bell System employees is more than ten years.

Nearly a third of the 315,000 employees own Bell System securities.

A fair deal for the public, the employee, and the men and women who have put their money in the industry is just good business

AMERICAN TELEPHONE & TELEGRAPH CO. AND ASSOCIATED COMPANIES — BELL SYSTEM

Entered as second-class matter at the Post-Office at Washington, D. C. under the Act of March 3, 1879. Acceptable for mailing at special rate of postage provided in Section 1103, Act of October 3, 1917, authorized July 10, 1918. Additional entry at Baltimore, Md., December 29, 1931.

EDITOR
Ovid Butler

ASSISTANT EDITORS
Lilian Cromelin
Erle Kauffman

NEXT MONTH

Aldo Leopold returns to AMERICAN FORESTS in October with one of his finest contributions—"Marshland Elegy." In fact, it is one of the real classics in the literature on conservation—something no one can afford to miss.

R. C. Wilson, associated with the California Forest and Range Experiment Station, has delved into the history of the remnant Redwoods of the Santa Cruz Mountains. His findings, intensely interesting and valuable, will be presented in the October issue.

"Planning Our Small River Valleys" is the title of the latest article by Henry S. Curtis, to be presented next month.

"Wildlife and Cycles" will be contributed by Leonard Wing, of the Division of Wildlife Management, of the University of Wisconsin. George A. Simmons will present Indiana's "Trees of Turkey Run" in picture and in story.

There will also be "Women in Forestry," by Lillian K. Starrett, and others.

Published Monthly by

THE AMERICAN FORESTRY ASSOCIATION

919 Seventeenth Street,

Washington, D. C.

35c A COPY, $4.00 A YEAR

CONTENTS

VOLUME 43 **September, 1937** NUMBER 9

AMERICAN FORESTS

Page

426 WHITE MAGIC IN NAVAJO LAND
By M. E. Musgrave

432 CAMP WATCHING
By Stewart Holbrook

434 A SHRINE IS SAFE
By Ben East

437 AFIELD WITH A HOOSIER ETCHER

442 POLLUTION — — — TOO BAD TO BE TRUE
By Blye Englis

444 FOREST GENETICS
By Lloyd Austin

447 EDITORIAL
Fibres From Forests

448 HUNTING BEE-TREES
By Havilah Babcock

450 MOUNTAIN HEMLOCK (Tree Series)
By G. H. Collingwood

456 AROUND THE STATES

458 BOOK REVIEWS

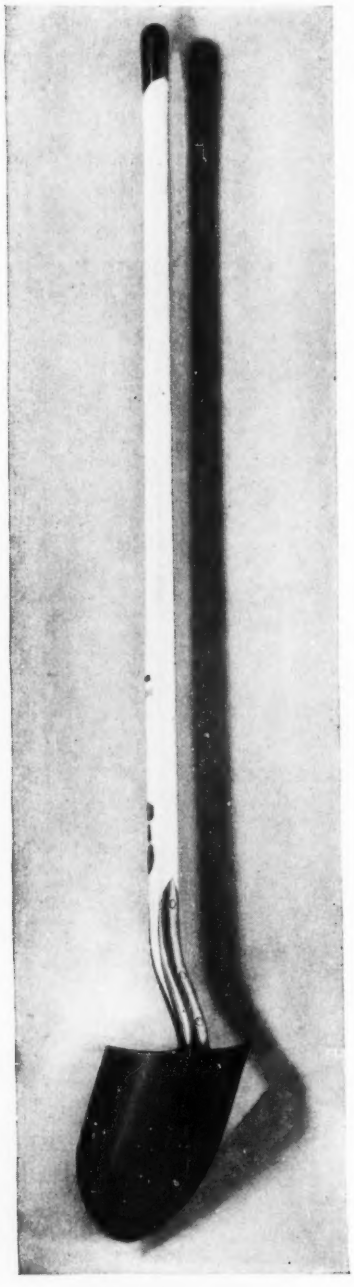
464 FORESTRY IN CONGRESS

465 THE CONSERVATION CALENDAR

468 "WHO'S WHO" AMONG THE AUTHORS

The Editors are not responsible for loss or injury of manuscripts and photographs while in their possession or in transit. All manuscripts should be accompanied by return postage. The Editors are not responsible for views expressed in signed articles. . . . Notice of change of address for AMERICAN FORESTS should be received by the tenth of the month preceding issue.

Member A. B. C.
Copyright, 1937, by The American Forestry Association



Good Citizens AND Good Shovels

Along the highways, on the railroad right-of-ways, in forestry work, in building operations, on landscaping projects, and on the farm . . . wherever you find men at work with shovels, there you will see good citizens at work on the really important tasks of building America.

It is the *Shovel* that starts operations for most great projects, and the same implement that puts on the finishing touches.

That men who work with shovels may labor with the satisfaction of greater accomplishment and contentment, Ingersoll Shovels are designed to handle more easily, to cut more quickly, and to hold their cutting edges better.

Balanced right, with strong smooth handles and blades of TEM-CROSS Steel, they are rapidly becoming the favorite "Good Shovels of Good Citizens" who use them.

Inquiries are invited. Address Dept. A.F.

YOU'LL FIND THEM "On the Job" Everywhere

TEM-CROSS INGERSOLL PROCESS STEEL

—has an interlocking mesh-grain structure. Ingersoll Shovels are available in all types and grades for every purpose.

INGERSOLL STEEL & DISC DIVISION
Borg-Warner Corporation
New Castle, Indiana

INGERSOLL Shovels
"THE BORG-WARNER LINE"

WE NEED 100 INDIANS QUICK!

"Got a big forest fire up here and it's getting worse. How quick can you ship 100 No. 90G INDIAN FIRE PUMPS?"

"Have them off to you in an hour. 100 No. 90G by express."

"Right. That's great service. Rush them on—we sure need them!"

That's the way a lot of our orders come in. Rush—emergency calls. And our customers are never disappointed in delivery. When INDIAN FIRE PUMPS are needed the demand is frequently *urgent.* A difference of a few hours in shipment may mean huge fire loss. While we guarantee PROMPT SHIPMENT we recommend having sufficient INDIANS on hand BEFORE THE EMERGENCY.

PHOTO above shows six men with INDIAN FIRE PUMPS running with fire apparatus to fight immense grass and forest fire on Long Island. While trucks can go only where roads are passable INDIANS (the one man fire departments) go everywhere, smothering fire in every nook and cranny.

CARRIES HIGH ON BACK

Please note how men are enabled to run without the tanks jostling up and down on hips. The 5 gallon curved, metal tanks carry high on the shoulders like the army pack. The outfit may be carried without discomfort or chafing. Nothing to bounce against the rump when walking or running.

COMBINATION BRASS NOZZLE FOR 30-FOOT STREAM OR A LONG COARSE SPRAY. NOZZLES CHAINED TO PUMP AND CANNOT BECOME LOST
HEAVY BRASS, QUICK OPENING WATER TIGHT FILLER CAP WITH REMOVABLE BRASS STRAINER. CAP HAS INSIDE CHAIN TO PREVENT LOSING.
COMBINATION BRASS HANDLE FOR CARRYING TANK AND FOR HOLDING PUMP
EXTRA HEAVY TANK HAS SOLID BRASS BOTTOM. ALL JOINTS LOCKED AND SOLDERED. BUILT STRONG

FORM-FITTING. VENTILATED TANK GIVES A CONSTANT CIRCULATION OF AIR BETWEEN TANK AND CARRIER'S BACK. IT PROTECTS THE BACK FROM THE COLD WATER AND MOISTURE IN THE TANK AND KEEPS THE BACK WARM AND DRY. THE FORM-FITTING SHAPE OF THIS TANK FITS THE BACK PERFECTLY. SNUG AND FIRM AND FEELS GOOD.

QUICK AND EASY REFILLING

Heavy brass, quick lock, large opening permits hasty refilling of the tank on the fire line. Removable brass strainer PREVENTS LEAVES, DIRT AND REFUSE ENTERING the tank to clog and give trouble.

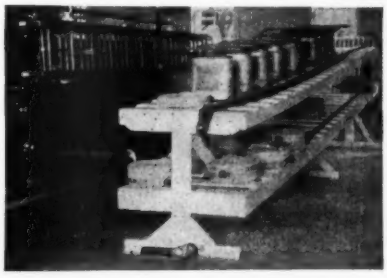
VENTILATED TANK

Form fitting ventilated tank allows continuous circulation of air between carrier's back and water tank. This prevents dampness, moisture and cold reaching carrier's back which remains dry and comfortable no matter how long the INDIAN is carried. Clear water continually kept in the tank makes the INDIAN ready for use at all times. Tank will not rot or mildew.

SEND FOR CATALOG AND PRICES

(at left)
"Mopping up" with INDIANS — getting into smoldering tree trunks and bush. 50 ft. strong stream completely extinguishes the blaze.

(at right)
Several INDIANS in rack at Long Lake, N. Y., fire house. INDIAN FIRE PUMPS are widely used by rural and city fire departments.



MADE BY D. B. SMITH & CO., UTICA, N. Y.

HERCULES EQUIPMENT & RUBBER CO.
350 Third St., San Francisco, Calif.

Pacific Coast Agents:
WESTERN LOGGERS' MACHINERY CO.
302 SW 4th St., Portland, Oregon

PACIFIC MARINE SUPPLY CO.
1217 Western Ave., Seattle, Wash.

J. E. Haynes

Yellowstone Falls

NATIONAL PARKS

■ The twenty-four National Parks, the single national historical park, and the sixty-eight National Monuments distributed over the United States, Hawaii and Alaska, and administered by the National Park Service have been developed on the basis of carefully considered and jealously guarded principles. These date back to the historic campfire in Wyoming when a group of public-spirited men agreed that the wonders of the Yellowstone should be protected by the Federal Government rather than subjected to the uncertainties of private ownership. Their decision resulted in the creation of the Yellowstone National Park by the Congressional Act of March 1, 1872.

With increasing popularity, pressure for the establishment of parks throughout the country has developed. Many of these are primarily of local interest and scarcely comparable to the unusual areas which were the original inspiration of the system. There has also been pressure for the commercial use of the resources reserved within the parks. Such efforts led the Directors of The American Forestry Association, in January, 1930, to approve the following definition of National Parks:

> "National Parks are spacious land areas essentially in their primitive condition and so outstandingly superior in quality and beauty to average examples of their several types as to demand their preservation intact and in their entirety for the enjoyment, education, and inspiration of all the people for all time."

This definition still stands as the ideal on which national park legislation is formulated, and on which the existing National Parks are administered.

Repeatedly, since the formulation of these standards The American Forestry Association has promoted efforts toward protecting the unique plant and animal life of National Parks and toward preserving to the fullest possible degree the wilderness character of the areas.

The record is one in which The American Forestry Association takes pride. It will continue to stand in the lead among national organizations dedicated to the protection of the high ideals on which the National Parks were established.

Note—In this space is presented each month the Association's policy with respect to timely phases of conservation.

THE AMERICAN FORESTRY ASSOCIATION

919 SEVENTEENTH STREET, WASHINGTON, D. C.

OFFICERS

President
JAMES G. K. McCLURE, Jr.

Executive Secretary
OVID BUTLER

Treasurer
GEORGE O. VASS

Forester
G. H. COLLINGWOOD

Business Manager
FRED E. HORNADAY

Vice-Presidents

Albert W. Atwood—District of Columbia
Harlan H. Barrows—Illinois—University of Chicago
Mrs. H. G. Bogert—Colorado—General Federation of Women's Clubs
Charles Elbert Clarke—Florida—The Junior Chamber of Commerce
William C. Coker—North Carolina—University of North Carolina
George M. Cornwall — Oregon — The Timberman
Asahel Curtis—Washington
Jay N. Darling — Iowa — American Wildlife Federation
Mrs. Isabella Selmes Greenway — Arizona
Mrs. Edward LaBudde—Wisconsin—Federation of Women's Clubs
L. F. Livingston—Delaware—American Society of Agricultural Engineers
Henry M. Lucas—Ohio—Trail Riders of the Wilderness
George H. Mead — Ohio — The Mead Corporation
Edward J. Meeman — Tennessee — Memphis Press Scimitar
Frank E. Mullen—New York—Radio Corporation of America
Kermit Roosevelt — New York — National Association of Audubon Societies
Norman H. Sloane—California—California Chamber of Commerce.
Dr. Alexander Wetmore—District of Columbia—The New National Museum
Frederick S. Winston — Minnesota — Quetico-Superior Council
Judge George W. Wood—Iowa—Izaak Walton League of America
Mrs. Robert C. Wright—Pennsylvania—The Garden Club of America

Board of Directors

Wallace W. Atwood, 1937—Massachusetts—Clark University
Philip W. Ayres, 1939—New Hampshire—Society for the Protection of New Hampshire Forests
F. W. Besley, 1940—Maryland—State Forester of Maryland
W. R. Brown, 1939—New Hampshire Forestry Commission
P. R. Camp, 1940—Virginia — Camp Manufacturing Company
Samuel T. Dana, 1937—Michigan—School of Forestry and Conservation, University of Michigan
Karl T. Frederick, 1941—New York—New York State Conservation Council
Henry S. Graves, 1941—Connecticut—Yale School of Forestry
William B. Greeley, 1938 — Washington—West Coast Lumbermen's Association
A. S. Houghton, 1939—New York — State Reforestation Commission
John C. Merriam, 1941—District of Columbia—Carnegie Institution of Washington
Joseph Hyde Pratt, 1938—North Carolina Forestry Association
Wilbur K. Thomas, 1938 — Pennsylvania—Carl Schurz Memorial Foundation
John W. Watzek, Jr., 1940—Illinois—National Lumber Manufacturers Association
William P. Wharton, 1937 — Massachusetts—National Association of Audubon Societies

THE EDITOR'S LOG

ONE sparkling morning in July of 1933, nineteen very hardy and very curious men and women met at Missoula, Montana, under the direction of The American Forestry Association.

They had come, many of them a thousand miles or more, in response to an opportunity given them by the Association to explore a true wilderness, to spend their vacations amid the grandeur of unspoiled nature without benefit of the conventional implements of society—even society itself.

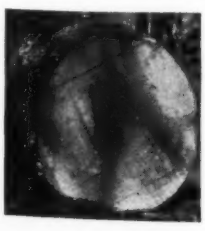
For twelve days this trail-blazing party followed the watercourses, traversed the flowered valleys and climbed the lofty mountains in a land so remote, so primitive in character, that it remains today much the same as it was when Lewis and Clark first found great herds of buffalo grazing there. Twelve days beyond the horizon, a hundred miles from the sound of the nearest automobile horn, two days of hard riding to the nearest post office, four days to the nearest swing orchestra.

Trees human hands had never touched, some standing by lakes that sun-dancing Blackfeet Indians forgot to name. Mountains still untrod; valleys of grass and flowers, unchanged since the buffalo left them to follow the trail to the plains and oblivion. The adventure of discovering these, of finding the real wilderness, of dwelling there awhile, of seeking its peace, its beauty, its power to restore, its companionship—these were the things, among others, that this very hardy and very curious band of men and women found in 1933 in the million acre wilderness of Montana's great Flathead and Sun Rivers.

These are the things men and women are still finding—one hundred and ten of them this summer—for from this pioneer expedition has grown the Association's Trail Riders of the Wilderness. Including this year of 1937, with seven expeditions, eighteen parties have gone forth for two weeks of wilderness enjoyment since 1933. From nineteen pioneers, the Trail Riders have grown into an organization of nearly three hundred wilderness loving men and women. Since the beginning in Montana, expeditions have been organized in Wyoming, Idaho, Washington, New Mexico and North Carolina.

That these expeditions into the wild and rugged country of America are entirely feasible for men or women in normal health and with an average amount of outdoor experience has been clearly demonstrated. In exploring more than twenty-five hundred miles of unfrequented trail there has not been a single incident to question the practicability of wilderness vacationing of this character under proper and adequate organization. These expeditions are not easy; they are not meant to be. You don't sleep on beauty-rest mattresses out there under the stars. Yet they offer no actual hardships—unless riding a hundred miles or more of wild trail, fishing in hidden blue lakes, or climbing summits of unnamed peaks to look down upon seas of clouds is considered a hardship.

So with the Trail Riders definitely established as a new and unique medium of both recreation and education, The American Forestry Association extends to those who love the outdoors enough to go where it can be found in its wildest form a cordial and friendly invitation to ride with one or more of its expeditions next summer.



Ovid Butler

Editor

The Old Medicine Man

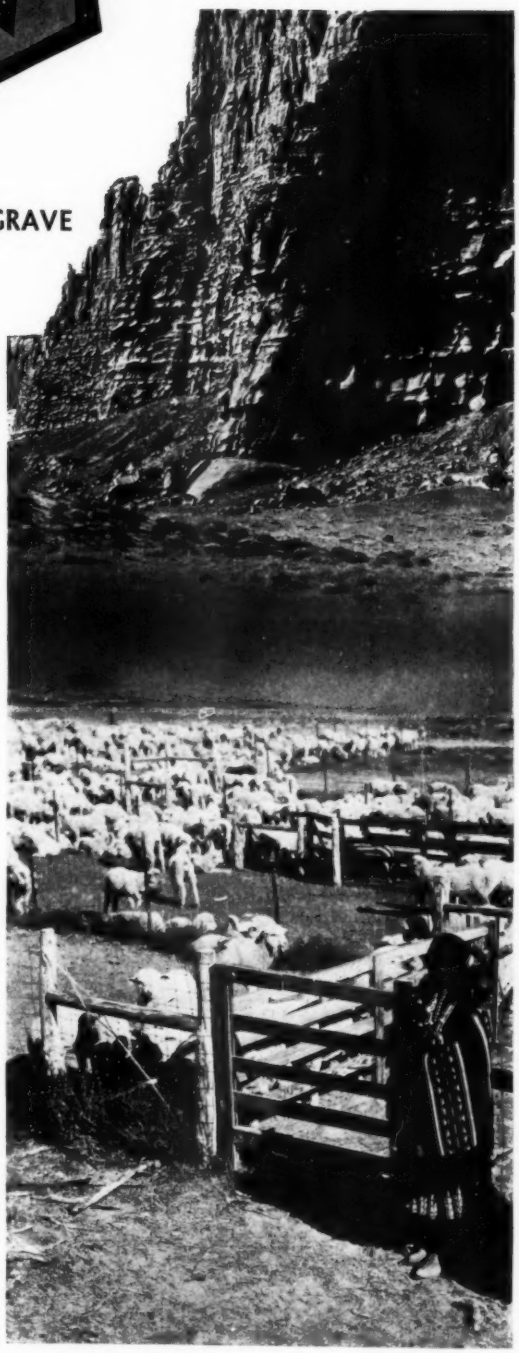
WHITE MAGIC IN NAVAJO LAND

Perhaps the most complex and difficult phase of the work of rehabilitating the Navajo country was the human element. The ancient customs, the religion with its numerous taboos, and the psychology of the Navajo had to be encountered, studied and understood before his cooperation could be secured.

In this article the medicine man, Hosteen Nez Begay, is a composite character representing the opposition whose suspicion and distrust had to be surmounted. So, too, is Natahni a composite, representing the white men who undertook the work of rehabilitation and whose sympathetic understanding, whose patience and "good medicine" have accomplished miracles.

By M. E. MUSGRAVE

HOSTEEN Nez Begay kicked his buckskin pony in the ribs and leaned forward as they mounted a slight rise. At the crest he checked the beast and sat looking at the wide, sage-dotted expanse spreading for miles before him. A soft bleating reached his ears and he glanced sharply to the left. In the shade of a huge, red sandstone rock that reared its bulk in splendid isolation above the level earth, a tiny Navajo girl stood beside her grazing sheep. The frown on Hosteen's forehead deepened beneath his cerise headband. The sheep were hungry; their querulous voices and their constant movements told him that. He looked about. There really wasn't much feed for them. Every year it grew scarcer and scarcer. Sage, bitter weeds and Russian thistles were plentiful, but where was the grass, the "winter-fat," the salt brush that had once made the sheep heavy with meat and with thick fleece? Why had this curse fallen upon the land of the Navajo? There was not a place in all the 16,000,000 acres of their Reservation where forage was plentiful. Flocks were constantly increasing, and the people—there were 45,000 of them now—could find no new pastures. What had they done to offend the gods of their forefathers? Even the skill of Hosteen himself, the oldest and wisest of all medicine men, seemed powerless to break the curse. He lifted his eyes fearfully to sacred Chuska's fir-clad peak. His passing glance caught the gleam of what looked like a long, silver thread lying atop a low ridge. He uttered an angry ejaculation. That fragile filament was a barbed-wire fence which marked the boundary of the Navajo Experiment Station at Mexican Springs. It was the largest of the Navajo projects, and it embraced 43,000 acres of land which the Navajos themselves



A Navajo girl stood by the flock of sheep

A typical Navajo ewe and lamb. With little feed and flocks constantly increasing, there was need for "white magic"

A Navajo family, in its summer home

had agreed to turn over to the white people of the Soil Conservation Service, cooperating with the Indian Service, with full right to manage it as they saw fit, even to the extent of telling the Indians who lived inside the fence what they could do and what they should not. The Dineh (he used the ancient tribal name meaning The People rather than the Spanish-bestowed "Navajo") had been willing to make almost any compromise to secure help for the ailing land; and the white men, as ever, were once again making promises of effecting cures. They had plans for making trees grow again in places where Hosteen's grandfather had seen them but from which they had long since vanished, and plans for making green grass and browse grow thick and abundant once more; they even spoke of slowing the rushing, destroying water of Nakai Bito Wash and turning it back into the gentle, useful, verdure-clad stream it had been many years ago when patches of beans, corn and melons had lined its shallow banks. Why the white men, that is, Natahni, their chief, had even hinted, so Hosteen had heard, at catching the vagrant, yellow sands that whirled and tossed in the air every time the wind blew and making them lie quiet under a cover of grass and flowers. Promises! Boastings! Bah! for the white man's magic!

The patter of small hooves roused him from his thoughts. Gledisbah was taking her sheep to the well before starting for home. It was several weary miles to the hogan, but each day they had to roam farther to find feed; water, too, was to be had now in only a few places. Weighed down by the troubles of his people, Hosteen rode slowly with bowed head.

Some time afterward the old medicine man was gathering herbs for a concoction to be used on a patient for whom he was conducting a ceremony or "sing," when he saw Beni Tahe driving a small band of cattle along the dusty road. Now, Beni was a favorite with the old man, for, although he had gone away to school and had later brought back a wound from the great war in France, he listened to Hosteen's tales of the old days with

sincere interest, and he showed a respect for age sometimes lacking in the younger men.

"We are selling all our cattle," he explained. "Commissioner Collier says the Government will give us fine, pure-bred stock. They have bought this stock from drouth areas in Texas and eastern New Mexico and will let us take cows if we sign papers to give back to the Government the first heifer calves that they have. Then another Navajo can take them instead of his scrub cows until all our people have good cows."

"No!" said Hosteen sharply. "It is no good. The fine cattle of the white man will not be able to live here on this place. They will require much care and they will have to be fed. That will cost much. They are not strong animals."

Beni ignored this. It had given him some worry of his own, but he didn't like to think of that part of it.

"Natahni says the yearlings will weigh many pounds more than these we have had," he went on cheerfully, "and the buyers will pay us much more for them. He says we can sell bulls for breeding, and that will pay us more than selling our steers." He trotted after his "scrubs."

Two months passed before the old medicine man succumbed to his curiosity and rode up to the glittering fence. Sure enough, there were the Herefords, still a little thin from their struggle in the drouth-stricken areas but very much alive. They had weathered the hardest part of the cold spring, and already the area inside the fence was quite green with new grass, while that outside, open to any number of wandering stock, was quite bare by comparison. It looked as if the white man's magic were beginning to work. Hosteen noted, however, that many of the plants were poisonous milkweed. When the cows ate that it would be the end of them. He was amazed, therefore, and a little chagrined as the weeks slipped by in quick succession to learn that the cows were all alive and were getting fatter every day. "Natahni says the cows eat the milkweed only when there is no grass," Beni explained to him, "and we now have so much

Where rushing waters went, destroying the land of the Navajos, before the dam was built to hold and divert them to gentle ways,—so that lush green grass and browse would grow once more

The diversion dam looking towards the spillway at the Navajo Experiment Station

Where white magic helped the ailing land. This vegetation was developed by water diverted by the Deer Springs Diversion Dam after the first season. It is natural regeneration

Corn planted by the Indians on the project was nearly four times as large and productive as that planted outside the area

grass that it is crowding out the weeds and they will soon be gone."

When Hosteen heard that the bewitched Navajos were trading two of their native sheep for *one* of the big Rambouillets which the Government men had managed to secure for them, he shook his head sadly. There had been more promises, he understood, of heavier lambs and much heavier wool that would be all alike and would, therefore, be much more valuable than the white, black, or brown clip from the native animals. He determined to take no one's word for this, so, despite his distrust of these white men, he visited the shearing camp to see for himself. When the big, panting sheep were driven in he could hardly suppress a gasp. His face remained a wooden mask, but his black eyes glittered. He watched the first clip weighed; it was twelve pounds. The native clip averaged four! Another, and another, eleven, and twelve, and fourteen pounds each. They were all like that. A large ram was brought in to be sheared. Even the white men crowded up to watch while he was expertly clipped. They craned their necks to read the scales. When the fleece was weighed it was twenty-six pounds! Hosteen could hardly believe it. He was not surprised that the Indians wanted more of these rams for breeding, and privately he approved their idea to pool the money they received for removing the native sheep from the area —it was only five cents a head each month—to buy some of these fine animals to be owned commonly by the tribe.

Natahni rode up on his big black horse and greeted Hosteen pleasantly. The old man muttered a reply and moved quickly away. But that night as he sat in the doorway of his hogan listen-

ing to the soft voice of Hostudi, the little sleepy owl, he wondered if he could have underestimated the white man's magic. He had heard it called "science." Whatever it was, the Indians were working at it like beavers in many places over the Reservation. Beni told him that they had already planted more than 3,000,000 trees and shrubs on the different projects. That seemed as many plants as there were stars in the sky. Some of them were fruit-bearing trees—pears, peaches, and plums. These were planted on sloping hillsides with little curves of earth on the lower side of the trees to catch and hold water after every rain. Along the arroyo banks they had stuck in switches of willow and cottonwood. These switches, that is most of them, Beni had solemnly assured Hosteen, hadn't a sign of a root. But after a time they had begun to grow! There was no doubt that, after a few years, these "switches" would be large enough to cut for poles for the hogans and their ceremonial fires. In the meantime, others would be started.

It was when he dropped into the Trading Post for a little tobacco a few weeks later that a group of his tribesmen came in to make week-end purchases. They bought coffee and sugar and many cans of peaches and tomatoes and great stacks of the loaves of snowy bread that are luxuries to the Navajo. Others came in and cashed Government checks. All were working on the Soil Conservation projects. What did they do? Hosteen was interested. They told him that they did practically everything under the instruction of the few white men on the staff. Even the straw-bosses were Navajo.

Now a good medicine man is usually rich, for his professional services pay him well, but the remuneration is usually in livestock. Of actual cash there is little, as his patients do not have it to give. But a good team of Indian ponies and a driver could make four dollars a day. Hosteen thought it over for several days. Then one afternoon he rode casually by the place where a big dam was under construction. From a distance it looked like a busy ant hill. Twenty-five or thirty teams drawing small slip scrapers piled high with dirt were being urged forward in lusty Navajo by sweating, singing, laughing Indians. Up the slope, dump, turn, down, refill, up again! There was never a pause in the procession. A few days later two new teams driven (*Continuing on page* 460)

White magic worked miracles. These fine Herefords had only been on the range at the Station for three months and were getting fatter every day

Navajo sheep eating silage at the Station and growing the thick fleece used exclusively for rug wool. White man's magic was "good medicine" for the Navajo!

"When the crew piled aboard the train which was to take them to town, I wasn't so sure about the beauties of

CAMP WATCHING"

BY STEWART HOLBROOK

"I walked down the camp street . . . staring at the gaping doors of empty shacks . . ."

WHEN I was a youngster in the remote reaches of northern New England, a man who watched camp during the hot, brief summer was a noble and somewhat mysterious character. There was still long timber in the back counties in those days, and logging, while well past its heyday in that section, made up a considerable part of the commerce there.

Watching camp, all we boys knew, was a job for a *man*. When the snow was melting in April and the loggers hiked down the long tote roads, heading for Bangor, Stewartstown, or Berlin, there to drink rotgut for a week and then to buy caulked boots and go down on the drive, they left behind them the solitary and romantic man who was to watch the camps until just before snow-fly in the late fall. They left him a barrel of salt pork, a jug of molasses, a box of plug tobacco, a bag of potatoes which were already sprouting, and a barrel of "patent" flour.

At intervals during the summer the logging superintendent might drive to camp in his buckboard to see how things were going; and he might take the watchman a few fresh vegetables and a handful of cheap cigars. Otherwise, except for an

occasional fishing party, the man watching camp lived alone with the hedgehogs and the bears.

There were notable stories concerning these lone figures who stalked out the blistering summer, keeping guard against both man and beast, and ever watchful for the worst enemy of all, forest fire. Especially did they have to watch the fishermen, city yahoos for the most part, for they were the ones who left their camp-fires burning.

Old Jim LaVoie, a giant French-Canuck and a notable man to watch camp, used to chase such fishermen back down the brook, even for miles. It was told of Jim, too, that once he caught a camp-foraging bear by the throat and strangled him until he was very dead. We boys knew this to be an actual occurrence, for one of the crowd had seen the bear's hide proudly displayed in the logging company's office in Stewartstown.

Had I known, when I was thirteen years old, that one day I would actually watch camp, I am sure that I would have looked pityingly at my fellows, even him who so often told me that he would be president of the United States.

I got my chance to watch camp some ten years ago. Not in New England, where the camp-watching germ first attacked me, but in the cloud-crashing timber of the Oregon woods, the last stand of the American logger.

It was late June when the foreman said it was time to shut her down. "We'll go to town tomorrer," he said. Later in the evening he asked me who I thought would be a good man to watch camp. My early ambition returned. "Me," I told him. He looked at me with that expression people have when they are talking to idiots. Then he looked at the creek down below camp. "Well," he said, "if you wanter."

When the crew piled aboard the train which was to take them to headquarters camp on the main line, I wasn't exactly sure about the beauties of camp watching. They jumped a-top the skeleton cars, swinging their suitcases and shouting ribald jests, and presently waved me a good-by as the locomotive whistle gave the high-ball. That toot went through my body. They were hittin' her for town! But I was committed to the job.

I watched the chugging, puffing engine as it rounded the curve and rattled down the high-line out of sight, taking with it everyone but me and the pigs. Valiantly I conjured up in my mind the noble yet now hazy figure of Jim LaVoie; yet his grand shade lacked the bolstering properties it should have given me. There was another jeering blast from the locomotive, dimmer this time. I turned to consider camp.

If you have ever watched camp you know what I found. I walked down the camp street with the mailbag on my back, staring at the gaping doors of the bunkhouses. The mailbag contained the only news I would have for two weeks at least, possibly longer. In it, I knew, were several newspapers and a few catalogs.

Of a sudden I realized that the camp had become desolation itself. Bunkhouses, until now so alive with husky, noisy loggers, all silent. A whiff of smoke idling from the cookhouse, but no cheery clatter of dishes and no reassuring odor of cooking. I wondered what had become of the chipmunks which ordinarily ran wild throughout the camp.

The silence was so profound that I stopped in front of my shack to listen for some sound. A cricket ground out his solitary noise, caring nothing that the loggers had gone to town. I envied him.

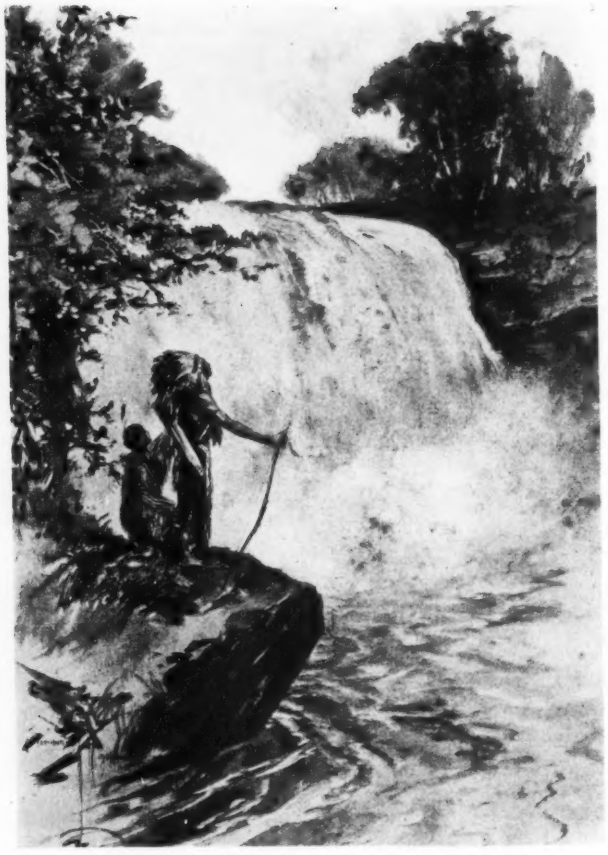
I threw the mailbag into my shack and sat down on the deacon seat outside to smoke a contemplative pipe. Far, far down the valley I could catch a puff of smoke, moving. It was the train. The sun, I noted, was edging toward the top of the mountain. Its rays became more mellow and less warm. For the first time I noticed that the gurgle of the brook had become louder. It was talking to itself: "Yes, I'm going, I'm going, I'm running down, over the stones, over the stones, to the river, and to Portland."

Portland! Going to Portland. That's where the loggers were going. Lights, people, Mecca!

(*Continuing on page* 459)

"I realized that the camp had suddenly become desolation itself. Bunkhouses, until now so alive with husky, noisy loggers, all silent..."

In this wilderness eagles still nest



A SHRINE IS SAFE

By BEN EAST

THE shrine of Hiawatha is forever safe! Are you one of the host who have read and loved the great legendary song? ". . . . Who love the haunts of nature,—Love the sunshine of the meadow,—Love the shadow of the forest, * * * * And the rushing of great rivers—Through their palisades of pine trees . . . ."

Then rejoice! Hidden away in the wilderness of the Northern Peninsula of Michigan — that broad spearhead thrust so boldly between the wide plain of Lake Michigan and the wider plain of Lake Superior—is a tract of unspoiled forest, of rolling tree-crowned ridges and shaded valleys, of dark tangled swamps and bogs where leatherleaf and Labrador tea rise from the soft gray carpet of the sphagnum.

The red deer will be safe

It is the home of the deer and the black bear, the porcupine and beaver, the red fox and coyote and other trail fellows of the North Woods. An occasional timber wolf, wary and man-wise, still leaves his trail on its winter snows. Above it now and again a bald eagle wheels in majestic circles and sets the echoes ringing with his wild free screams. The northern pileated woodpecker—the log cock—still finds haven there, and in the deep swamps a few Canada spruce grouse make their home. The gray jay is there, and the tiny saw-whet owl. And on a tract of barren marshes in the sandy pine plains just to the

north a dwindling handful of sandhill cranes—majestic wildfowl all but vanished from the Lake Superior country—still find the seclusion they demand on their nesting grounds.

It is wilderness unspoiled, that tract of forest, a wilderness of birch and beech and maple and hemlock, of spruce and cedar and tamarack in the bogs.

And in the heart of the tract, like a blazing gem in a perfect setting, the tranquil Tahquamenon River rolls its golden flood over a crumbling sandstone ledge in a thundering waterfall that is the mightiest and loveliest of all the waterfalls along the south shore of Lake Superior, and that is held by many to be the loveliest waterfall in the midwestern United States. If you have read the Song of Hiawatha you will recall the Tahquamenon as "the rushing Taquamenaw." Only the name is changed. The deep, dark, mysterious river remains the same today as in that distant day of which Longfellow tells us, when

> ". . . . the wrinkled old Nokomis
> Nursed the little Hiawatha,
> Rocked him in his linden cradle,
> Bedded soft in moss and rushes."

The Tahquamenon rises in the springs and swamps of western Luce County, a hundred odd miles northwest of the Straits of Mackinac, and for many miles it is a quiet, unhurried river, winding through swamps and through wide willow marshes where deer love to come, out of the forest in the hot days of summer, to escape their insect foes.

Gradually the banks of the river change to dry land, grow higher, gradually the current quickens, as if eager for the tryst that awaits, eager for the mad leap, the spray and sun and rainbow and foam. And so at last the river comes to the lip of rock and hurls its waters over — dark waters, stained with the roots of alder and spruce in the swamps above—in a leap half a hundred feet high and more than two hundred feet in breadth. And only the wilderness listens to the thunder of that leap, only the rocks and trees hear the answering murmur of the wind.

The Tahquamenon rolls over a crumbling sandstone ledge in a thundering waterfall in the "land of Gitchee Gumee, By the Shining-Big-Sea-Water"

Man has not yet put the marks of his hand upon this lovely waterfall nor the forest about it.

For six miles below the falls the Tahquamenon runs between high, timbered banks, with deep quiet reaches and rock-broken rapids. Then it races in a wild torment of white water down a long rocky chute, flings itself over two final ledges, creating the Little Falls, that rival the greater cataract above for misty loveliness, spreads into a great horseshoe shoal and leaves the forest, to enter the swamps and cutover pinelands on the last stage of its journey down to Lake Superior, the mighty Gitche Gumee, where it finally spills its dark flood.

For years there has hung over the river and its forests, and especially over the two waterfalls, the shadowy threat that this region of primitive beauty would be despoiled, that unwise roads would penetrate it and end the reign of the wilderness, that the timber would be cut or that waterpower development would ruin outright the beauty of the two falls.

For years it has been a dream in the hearts of a far-sighted handful of Michigan conservationists that this shrine of Hiawatha might be preserved, unspoiled in its wild setting, as a recreational area for those who love the beauty of the northern wilderness.

And at last the dream has come true. Michigan has found a way to acquire and protect the Big Falls, the miles of wilderness-cloistered gorge below, and the Little Falls that climax all the scenic loveliness of the great river.

The river in a tranquil mood—deep, dark, mysterious today as it was when "the little Hiawatha, Learned of every bird its language"

No highways will traverse the wilderness wnere Hiawatha and his friend, Kwasind, the strong man, walked together in the sun and shadow of the forest. No logging roads will wind across the hills were stood the lodge of Nokomis. No man-made dam will still the mighty thunder of the river, where it keeps its rainbow-decked rendezvous deep in the heart of the silent forest.

The red deer there in the shrine of Hiawatha will be safe, as will Shuh-shuh-gah, the heron, and Ah-meek, the beaver, and all the other wild creatures of forest and river, ridge and swamp.

The plan to make the Tahquamenon and its falls into a State Park of wild and undeveloped character, launched years ago, made little headway at first. The river and the falls and the forests were privately owned, and it was not easy to obtain the money for their purchase by the state, especially through the lean years of the depression.

Public lethargy stood in the way for a long time, but gradually sentiment began to rally behind the plan and the demand to save Hiawatha's river gathered momentum.

The ax of a logging company cut close, within three miles of the Big Falls itself, and then the ally of the ax, forest fire, roared through the cut-over tract, ate into standing timber, was halted at the very gateway of the falls country.

The clamor to protect and preserve the region grew louder. Important tourist and sportsmen's organizations in the Upper Peninsula of Michigan took up the cry. Congressman Roy O. Woodruff labored unceasingly in Washington. Others fought at home.

Then victory at last, unpredicted, literally out of a clear sky. The United States Forest Service would buy 2,000 acres of land on the Tahquamenon for exchange with the Michigan Conservation Department.

Approval of the purchase by the Federal Forest Reservation Commission, of which Woodruff is a member, was announced last fall. The 2,000 acres will be only the nucleus of the tract, but it is enough to guarantee protection to the river and the falls and their immediate setting. More land can be added and will be.

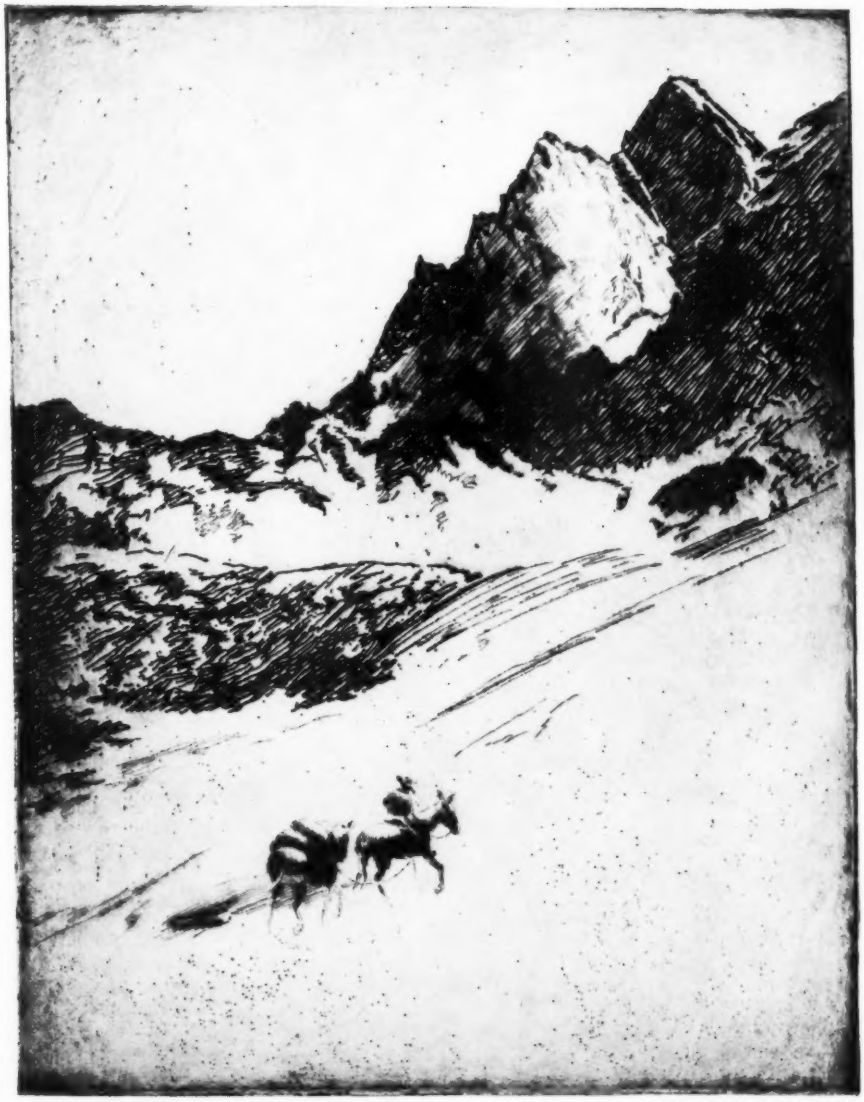
Michigan had its trading stock set aside and earmarked, in the form of scattered parcels of state-owned lands lying within National Forests in the state, lands wanted by the Forest Service to block up holdings.

The machinery of acquisition and exchange was put in motion. By spring, state conservation officials expect, Michigan will own the shrine of Hiawatha.

Some development work is to be done—but it will be a development carefully planned, closely guarded, certain not to mar the wild beauty of that shrine "In the solitary forest by the rushing Taquamenaw."

"Oh the long and dreary Winter!
Oh the cold and cruel Winter!
Ever thicker, thicker, thicker
Froze the ice on lake and river
Ever deeper, deeper
Fell the snow o'er all the landscape"—sang the poet, of the year of the bitter famine,—and his song is borne out by this picture of the frozen gorge with its mighty ice pendants, making of man a puny midget

AFIELD WITH A HOOSIER ETCHER



"The Road to the Roof"

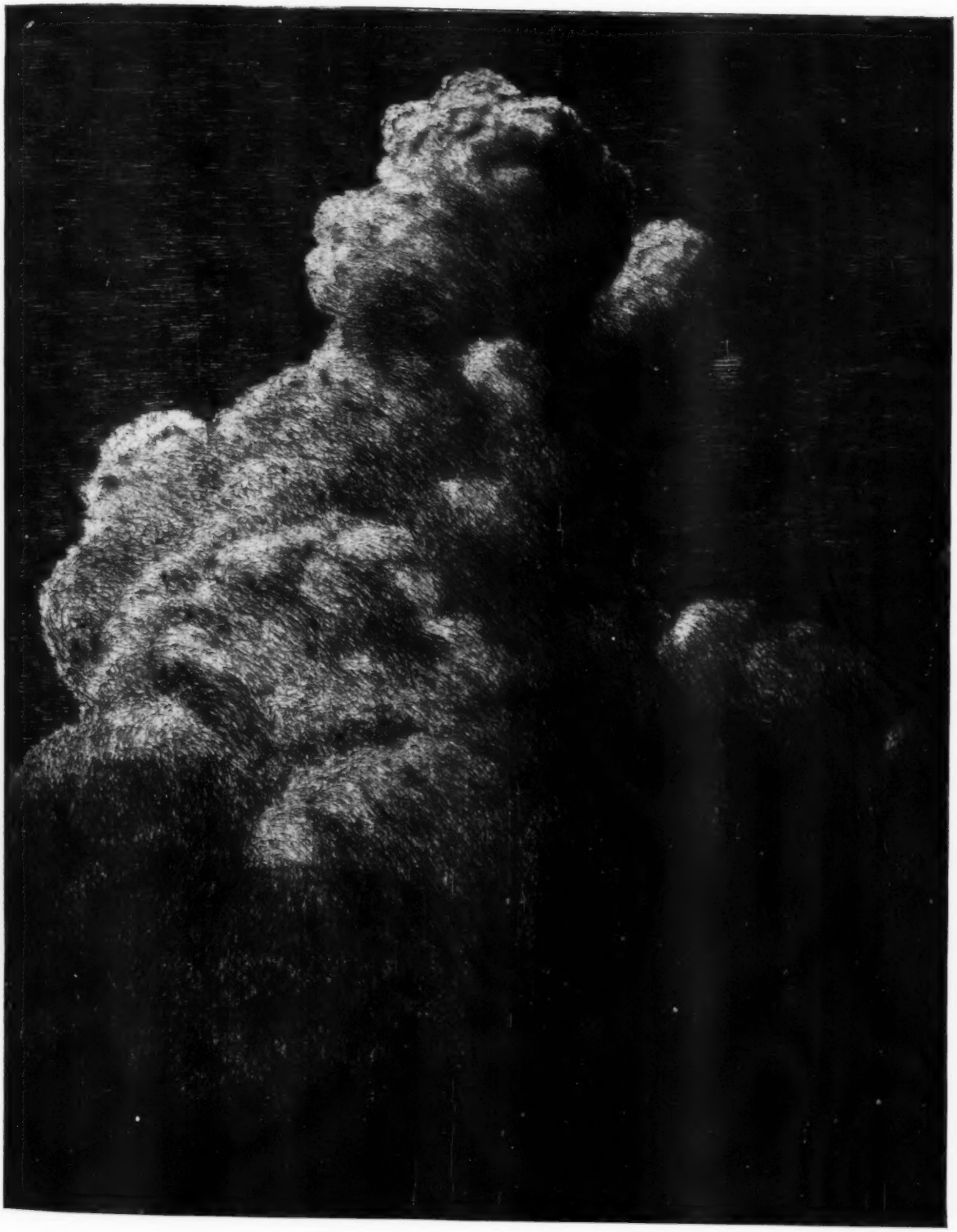
Paul Shideler, the Hoosier whose portrait etchings of James Whitcomb Riley, Kin Hubbard and other well known and beloved figures have attracted much attention, is sharing his remarkable genius with nature —with bold mountains, with the delicate beauty of quieter, more placid landscapes, with trees, with clouds, with green horizons. And the Editors of American Forests are privileged to present here a series of his etchings—subjects showing the character and scope of work that will undoubtedly win the same recognition and honor as have Mr. Shideler's portrait etchings.

"The Road to the Roof," presented on this page, was inspired by the rugged beauty of the Grand Teton National Park, in Wyoming. In "Canal Bank—Foggy Morning," on the following page, Mr. Shideler has captured and preserved on copper a bit of his native Indianapolis—a very appealing bit. Facing this is "Dimming Day," perhaps one of the most beautiful in his collection. It is imaginative. "Benedicite," which follows, was inspired by a California mission, framed by trees. "Hoosier Hillman," a truly remarkable characterization, originated in Brown County, Indiana.

A native of Indianapolis, Mr. Shideler has devoted most of his life to study and work there. A product of the John Herron Art Institute, he first worked in oils, and then turned to architectural work in painted fired glass. For a number of years now etching has been his sole medium, and national recognition and honor for portrait etching have come to him. Late this year, Mr. Shideler will exhibit at the Corcoran Galleries in Washington, D. C.

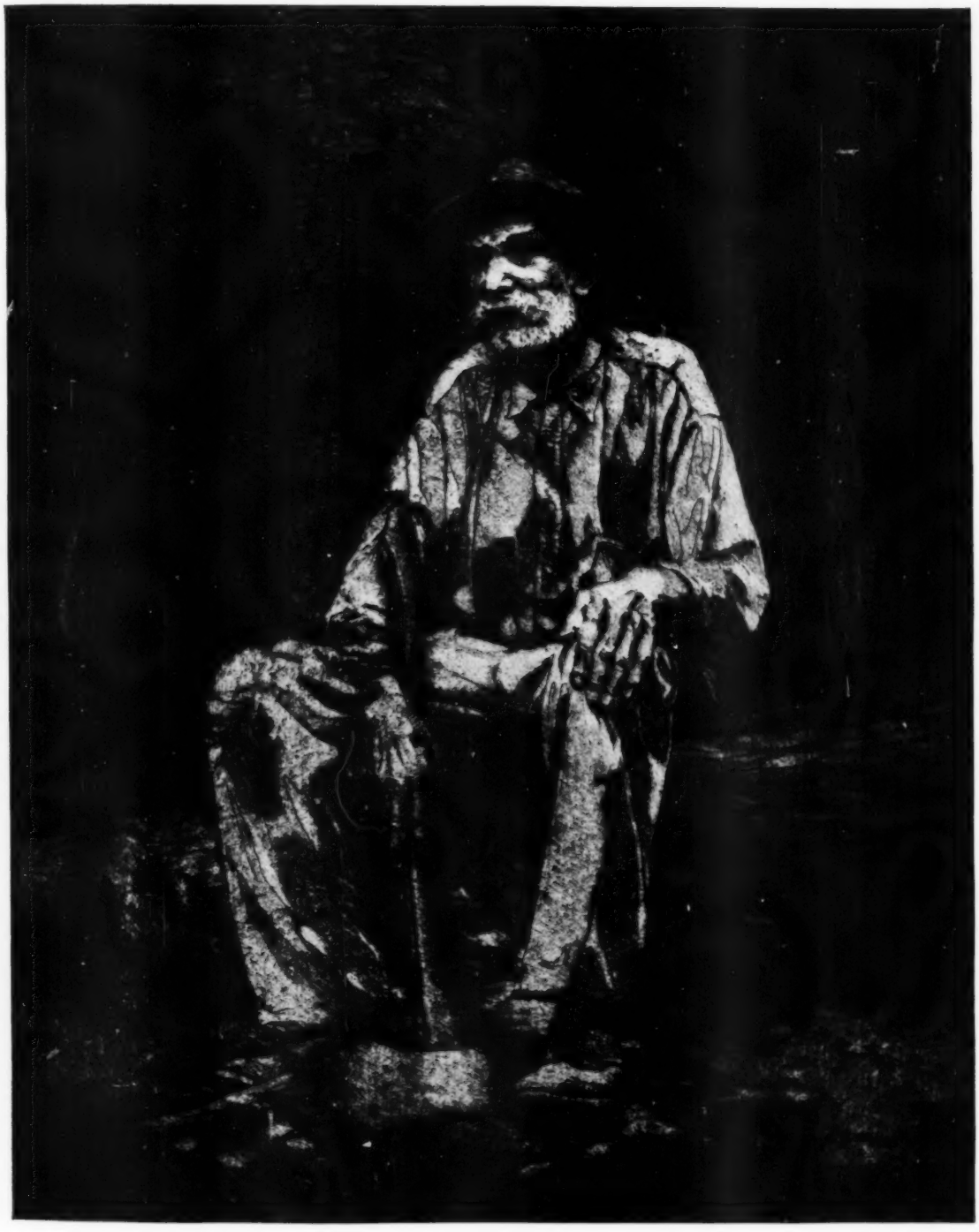
A member of the Chicago Galleries Association and the Indiana Printmakers Society, Mr. Shideler has for many years been head of the art department of the "Indianapolis News."

"Canal Bank—Foggy Morning"



"Dimming Day"

"Benedicite"



"Hoosier Hillman"

Pollution means more than dead fish

POLLUTION - - -

TOO BAD TO BE TRUE

By BLYE ENGLIS

(Photographs by Courtesy of the Bureau of Fisheries)

ALTHOUGH we are prideful of our reputation as a down-to-earth people, who does not falter at the stark realism of using water that was used a short time before by another? Water used in a city near a river's source is used again further down stream and this goes on until the river releases its filthy burden into the sea.

At each city John Smith pays for purification of the water, then pollutes it for the next fellow down stream—with his compliments, as it were.

Public Enemy No. 1 is not an individual but a network of polluted rivers that menaces the nation. The seeming remoteness of stream pollution is deceptive; because of its effect on our health, our recreation and our finances, no other national hazard is more intimately interwoven with daily living.

Industrial plants use large volumes of water for operating purposes and their waste waters and refuse contain harmful chemicals that eventually kill all fish life and poison the rivers; cities dump tons of their raw sewage into the same rivers; oil from ships ruins beaches and clogs the plumage of wild fowl so that they die by the thousands. This is the three-point pollution problem that affects the nation, particularly the eastern section of the United States.

Two Senate bills, backed by the anti-pollution movement, would make it imperative that industries treat their trade wastes to eradicate the chemical poison therein; that every city reduce the solids of its domestic sewage and that ships install equipment to abate their crude oil nuisance, with the Federal Government responsible for the purity of the national water supply.

While many industrialists have been willing tc comply, others claim that if unable to discharge their wastes into the rivers "as is" they will have to shut down.

"What!" they cry, "Scrap an industry because of a few dead fish!"

But are a "few dead fish" the extent of the damage? What about our right as a nation to economical fish food and the unfair ruining of the fish and shellfish interests? What about our recreational pleasures taken from us by pollution—no swimming, no wading, no boating, nothing but open sewers? It is said that half the

Dye waste, freed from this sewer, discolored and polluted water for many miles downstream

American people are behind the wheel and the other half listening to the radio, but this is gross libel. Summer leisure finds us out in the open at mountain, beach, river, or lake.

But if pollution finally forces us to scrap our recreational privileges, what about our health? Physicians agree that sickness is often not the result of staying in the water too long but of being in polluted water at all; that typhoid fever, dysentery, tonsilitis, bronchitis, abcesses, boils, eye, ear, nose and throat ailments, blindness and deafness can be contracted in polluted streams. Periods of flood or drought so intensify the pollution danger that various fatal diseases become imminent. In the last ten years we have had three of the largest typhoid epidemics on record.

Some time ago a reformer of the Don Quixote type tried to relegate the supposedly germ-ridden "old oaken bucket" to innocuous desuetude while a corporation discharged tons of its harmful untreated trade wastes into a nearby river. To make the situation more ironic, city folks in an effort to get away from each other as well as the heat, splashed merrily about in this same polluted stream.

How the gods above must laugh to see one of our jittery fuddy-duddies daily atomize his throat, sanitize his food and drink and then trip blithely into a polluted stream wherein lurk dangerous baccili that will attack any open abrasion, even so rare a thing as an open mind. And Moses, that much-heckled man of God, what chance of survival would he have had if as a babe he had been hidden away in one of our polluted rivers, instead of the River Nile?

Sewage from cultured, widely-traveled Bostonians is the same as that of rough-and-ready Westerners who have never been out of the county, while much sickness on farms is due to seepage from a Chic Sales masterpiece reaching and polluting the well water. Are we 20th century people with 12th century minds that we continue to discharge our untreated wastes into rivers and lakes, killing all fish life and spoiling the waters for our own use? Europeans frequently accuse us of high living and low thinking. Can we deny the allegation when we consider that many of our once beautiful rivers are now open sewers?

Were we at war the enemy could scarcely do more to pollute our streams than we do ourselves. Many of our once beautiful streams are now open sewers

Were we at war the enemy could scarcely do more to pollute our streams than do we ourselves, and the destruction of our water purification plants in war time would immediately poison us with virulent diseases and completely demoralize the nation. (*Continuing on page* 452)

FOREST GENETICS

By
LLOYD AUSTIN

A New Science Utilized to Advance American Forestry

Where interesting experiments in speeding up the production and development of trees are being made—the Arboretum of the Institute of Forest Genetics in the Sierra Nevada foothills. Above—A tree-breeder at work

THE WIDESPREAD interest in conservation and reforestation throughout the nation today is focusing attention more and more upon the need for improved strains of forest trees. People are awakening to the realization that the commonly-used forms of even the best species of existing timber trees are, in most instances, comparatively ill-adapted to planting under present economic conditions.

Is it not too much to expect that the wild types of trees as found in nature would be ideally adapted to meet the exacting demands of the present day? Centuries ago the agriculturists realized the inadequacy of wild plants and animals and began their efforts to develop superior strains. Today, after an extended period of breeding and selection by innumerable individuals and organizations, there are available for the use of modern farmers a great many improved types of farm crops, orchard fruits and domestic animals. Most of the original wild types have long ago been abandoned for economic production.

Three-yearly nursery section panorama—right, enclosed frame for one-year old "Progeny Test" and hybridizing experiments; foreground, two-year old "Species Test" beds and in the background are seen remnants of the results of the three-year old experimental nursery

It is little short of amazing then, that at this same period of development almost all reforestation activities are seriously encumbered, and rendered only partially effective, by the fact that they must, of necessity, utilize the wild, primeval types of forest trees that have not been improved from those that were available when white man first trod upon American soil.

Why such a paradoxical situation? There are probably two fundamental causes. In the first place, so long as there was an abundance of virgin timber, forestry was, to a considerable extent, merely a matter of protecting, harvesting and marketing nature's accumulation of centuries. But now that man must take an active part in restocking the vast areas of denuded land, timber must be regarded as a crop, and as such falls naturally and properly within the domain of the plant breeder or geneticist. Secondly, it seems likely that the great longevity of timber trees, and the infinite complexity of the problem, have, until recently, deterred foresters and geneticists from giving detailed thought to the wonderful and stimulating possibilities of specializing in this particular field of research.

Administration Building and the Institute's headquarters

In 1924 there was no institution in the United States, and probably none in the entire world, devoted solely to the production of inherently superior rapid-growing strains of forest trees. But in 1925, through the extraordinary vision and foresight of James G. Eddy, a lumberman of Medina, Washington, the Institute of Forest Genetics was founded at Placerville, California. Mr. Eddy's knowledge of the practical aspects of forestry and his studies of plant-breeding achievements led him to the conviction that the improvement of the wild strains of timber trees is both necessary and feasible — a conviction that has since been abundantly confirmed.

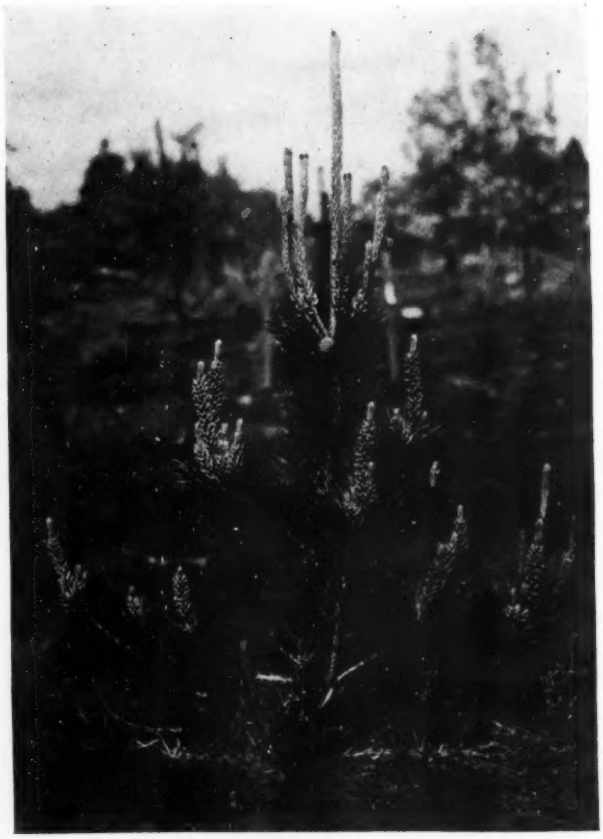
Many have thought that the genetical principles of selection and hybridization could be applied to forest trees, but no other American took steps to actually establish an institution devoted solely to that purpose. His never-ending enthusiasm, his stimulating counsel, and his personal support of the entire investigative program for the first eight years, have made possible the progress that has been made.

As the research in this virgin field has progressed, and as its aims and purpose have gradually broadened to meet the needs of the nation, there has been a natural and corre-

One of the Institute's fastest growing trees—this Monterey pine has shown an average growth of over four feet a year for five years

sponding broadening of the organization of the Institute. In 1932 the original name, the Eddy Tree Breeding Station, was changed to the Institute of Forest Genetics, to better express the broad and scientific character of the investigations being conducted. At that time the property and control were transferred to a national Board of Trustees of eighteen prominent scientists and business men well qualified to guide the destinies of such an institution.

During 1933 and 1934 the Carnegie Institution of Washington made several grants to the Institute to aid in carrying forward its protracted research work. Shortly after this the United States Bureau of Plant Industry, and later the Soil Conservation Service, helped substantially in financing the investigations which have a close connection with the expanding program for erosion control. The United States Forest Service also assisted materially during this period.



A Japanese black pine has flowered thus abundantly at four years of age from seed

Another important and auspicious step in the organization of the Institute took place during the latter part of 1935. As a result of the efforts of the Trustees and other friends of the Institute over a period of several years, the plans to join this national work for public benefit with the research work of the United States Forest Service were made possible by an initial Congressional appropriation of $50,000 specifically for the genetical work of the Institute. Although the Institute of Forest Genetics is now affiliated with the California Forest Experiment Station of the Forest Service, the investigative work will retain its national character and scope. The Board of Trustees is being continued as an Advisory Board.

Placerville, California, was chosen as the site for the Institute's main experimental station because of an unusual combination of favorable conditions. It lies in the center of the belt containing the finest stands of the principal western pine, ponderosa pine. Within the confines of the State of California can be found more species of pines, on which the Institute is specializing, than grow wild in any area of similar size in the world.

Climatic conditions are naturally of fundamental importance in determining a suitable location for an enterprise of this character. The average growing season to date at the Institute is 237 days. The lowest temperature ever recorded is sixteen degrees Farenheit, which is comparable to central Florida. The location chosen is one of the few in the entire United States that is situated in an important forested area and that has a climate sufficiently mild to permit assembling large collections of basic tree-breeding material from nearly all parts of the world, as is successfully being done at the Institute.

Although the climate at the main experimental station itself is quite moderate, there is abundant opportunity, within a driving distance of fifty miles, to obtain testing areas in the foothills and higher reaches of the Sierra where minimum temperatures range from sixteen degrees above zero to thirty degrees below. On the Atlantic Seaboard one would have to travel about a thousand miles, from central Florida to New England, to find an equal range in minimum temperatures.

During the ten years since its founding the Institute has uncovered many encouraging facts that indicate clearly that forest genetics is not only entirely feasible, but that it will yield usable results in a much shorter time than had been anticipated. Some of the very factors that are ordinarily regarded as serious obstacles to progress have been overcome and have been turned about so that they now serve as material aids to the tree breeder. For example, the long life of timber trees was regarded by many as a factor that made it seem likely that it would be at least several decades before tree breeders could offer to forest planters seeds of improved new types in sufficient quantities to (*Continuing on page* 466)

EDITORIAL

FIBRES FROM FORESTS

THE uses of wood are infinite. They are no longer limited to fuel and lumber, although rotary cut veneers and plywood have greatly enlarged that field. Neither can the uses of wood for pulp and paper be limited, for with chemical refinement of cellulose new fields in the manufacture of artificial fibres and plastics have been opened up. These new uses have progressed to such an extent that manufacturers of textiles and plastics from cotton are forced to recognize wood as a potential if not an immediate competitor. This surprising situation is revealed among a wealth of thought-provoking information in the report "Technological Trends and National Policy," recently released by the National Resources Committee.

Cellulose is that inert substance constituting the chief part of the solid framework of plants. Wood as a product of plants consists largely of cellulose. Its molecular structure is still to be determined, but it has long served the textile, paper, and lumber industries. More recently it has supplied the raw material for pyroxylin, artificial leather, film for photographic purposes, and for wrapping materials, lacquers, and that amazing chemical fibre, rayon, which the report declares "has blurred lines between social classes." Notwithstanding the tremendous advances in the production and use of cellulose, however, the writers of the report count its refinements among the six great industrial developments of the century and envision its future in direct proportion as our knowledge of it expands.

"The producers of cotton," according to the report, "seem to have assumed that no other source of cellulose could compete with the cotton fibre, but that has not proved to be the case. Perhaps a realization that substantial improvements in fibre from wood were necessary if it was to compete with cotton has been one urge for research in the field. But the result is that alpha-cellulose from wood, besides being much cheaper, is now preferred for some uses, and unless something can be done to improve the cellulose available from cotton linters, so that it holds its place in quality while at the same time becoming less costly, that source is likely to suffer materially through decreased demand. Many efforts have been made and continue to be made to use cellulose from cornstalks, from sugar-cane, and elsewhere, but costs of collection and processing, the fact that annual crops must be gathered and stored, and the advantage of cellulose concentration in wood, make it difficult for these other products to compete."

So wood is coming into new uses and we find an economic reason for the rapid disappearance of the sawdust burner as well as for new pulp and paper plants now being erected in alarming numbers throughout the southern pine region and on the west coast.

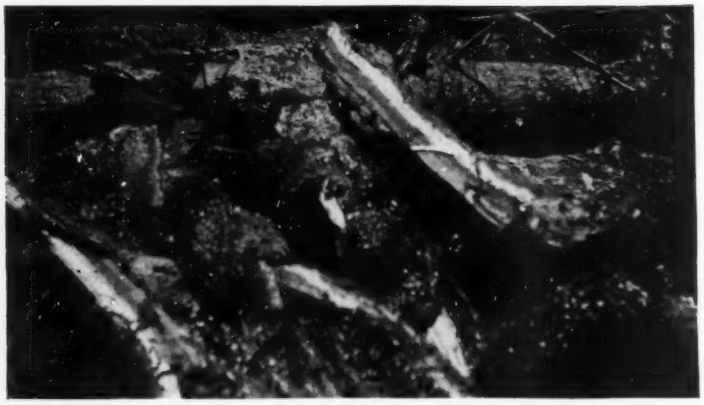
With this in mind, one may sympathize with the banker who is reported to have described research as an activity which only serves to make banking hazardous, and ask what is the future of forestry in America. If cellulose from wood is to be the basis of enlarging industries, what will be the future of the lumber industry and what adjustments can we foresee in the uses of land? Big trees will always be necessary to make boards, but sustained yield forest management takes on a new significance when one considers the probability of profitable crops of small sized trees.

The possibilities are like the infinite repercussions of a billiard ball whose movements are impelled from an ever renewing source of energy. In this case the energy is derived from research, for more than ever before the world is realizing the power of knowledge.

The report is broader than forestry, encompasses all industry, and unrolls a kaleidoscopic scene to show amazing scientific advances in every field of human activity. But the person interested in forestry, in the conservation of our natural resources, and in the developing use of land may well pause to wonder what changes wait beyond our limited horizons. Fibre from wood may not displace fibres from other plant and animal sources, but few will question that wood has entered a field which is destined to change the living and working habits of vast numbers of people. It may open up uses for land hitherto considered too poor for economic consideration.

HUNTING BEE-TREES

By HAVILAH BABCOCK



This hollow oak yielded fifty pounds of choice product

"A swarm of bees in May,
Is worth a load of hay.
A swarm of bees in June,
Is worth a silver spoon.
A swarm of bees in July,
Is not worth a fly."

Removing honey from an obstreperous colony of black bees in a dead chestnut

THIS time-honored dictum was as much a part of my childhood legacy as the precious rigmarole about "rich man, poor man, beggar man, thief." How old the dictum is I cannot say, but representing as it does a prevailing truth, it doubtless goes as far back as bee-keeping itself. And that goes pretty far back.

The antiquity of bee-keeping is attested by numerous allusions in classical literature and tradition, and by various references to the subject in the Bible. Samson, for instance, once propounded a riddle that gave the Philistines a seven-day headache: "Out of the eater came forth meat; out of the strong came forth sweetness." The answer was a swarm of bees that had set up housekeeping in the carcass of a lion. Even in ancient times bees apparently had the habit of establishing themselves in the most surprising places.

Bee-tree hunting is still the favored outdoor pastime with thousands of Americans in various sections of the country, but notably up and down the Appalachian cordillera.

"If your time is worth more than a dollar a day, you can't afford to hunt bee-trees," remarks a treatise on bee-keeping. Yet many experienced hunters find it a source of income as well as enjoyment. I have run into old Nestors who have found and cut as many as twenty-five bee-trees in a year. Down in the Ozarks you "hear tell" of old-timers who eke out a livelihood by hunting bee-trees.

Up in the Blue Ridge Mountains of Virginia I once met a grizzled

The author's son found and cut this prize cache in his own right

and picturesque veteran they called Sourwood Bill who, according to neighborhood report, had found and cut a thousand bee-trees in his life. And Buck Doss, another hunter who has rambled the foothills of Piedmont Virginia in quest of bee-trees for the better part of fifty years, tells me he has found more than five hundred—as many as fifteen in a single day.

Bee-trees are hunted for two reasons—the honey store and the bees themselves. The quality and quantity of the honey taken naturally varies with several factors. It may range from five pounds to a hundred, or in extreme cases one hundred and fifty pounds. And it may be almost inedible, or have a flavor and clarity unequalled by domestic bees.

The bees captured are ordinarily more valuable than the honey. The majority of so-called wild bees are absconding swarms that have simply reverted to nature. Occasionally I have run into a tree colony of apparently pure Italians, although tree bees are usually hybrids, though none the less productive. They are easily domesticated, become docile with the least decent handling, and are easily reconciled to their new habitation. Of the dozen hives in my backyard apiary at present, ten colonies were taken from the woods, yet they averaged one hundred pounds of first-class honey apiece last season.

Infrequently I run across a wild colony of little black bees. These little daughters of war are not exactly distinguished for their sense of humor, but they are marvellous little honey factories. And they can earn a livelihood under circumstances that would baffle most domestic colonies.

The season to hunt for bee-trees depends on whether one is interested primarily in getting the honey or capturing the bees. If bees are the main consideration, the tree should be cut before the honey flow sets in, say along in May or June, in time for the captured colony to rehabilitate itself and lay up sufficient store to see them through the winter. If honey is the main object, the tree should be cut toward the end of the honey flow, along in September or October, making allowances for variations of season and climate.

As to the best locality in which to hunt for trees, there is no substitute for common judgment. Two or three general observations, however, might not be amiss. Hunt within reasonable proximity to domestic colonies, unless you are intent on procuring the original black bee, since escaping swarms comprise the majority of wild bees, and in timber containing sizable trees, since larger and older trees are more likely to afford the necessary hollows and crevices that recommend themselves to reconnoitering scouts. Cliffs and "hog back" ridges near running streams are usually a good bet, especially if the section abounds in sourwood.

Roughly speaking, there are three methods of locating bee trees, the first of which is too elementary to call for enlargement. It consists simply in "giraffing" up at every likely-looking tree in the woods. Such a hit-or-miss affair is scorned by the real bee hunter, who commonly relies upon one or two other methods.

The most effective way of determining the probable location of a tree is by observing the line of flight of watering bees. During the summer bees require an abnormal amount of water for raising their young and, being creatures of habit, they water pretty regularly in the same place, which is seldom more than half a mile from the tree. But you must keep your eyes peeled on sandbars and sunlit openings. There is no dilly-dallying with a drinking bee. She fills up quickly and hits for home.

The other method differs from the method already mentioned in that the observer follows the flight of nectar-gathering bees rather than watering bees. (*Continuing on page* 462)

"Young wild bees are perch-bait of the best kind," declares the author, as he prepares to follow a bee-tree raid with a fishing trip

Fitting a section of wild honey, full of larvae, into a weak domestic colony

MOUNTAIN HEMLOCK

***Tsuga mertensiana* (Bongard) Sargent**

By G. H. COLLINGWOOD

MOUNTAIN hemlocks clothed in dense blue-green foliage frequently stand silhouetted against high mountain skylines, and are called black hemlock. In southern Alaska it grows at elevations from tidewater to 4,000 feet above sea level. On the slopes of the Cascade and Olympic Mountains of Washington, it grows at elevations from 5,000 to 7,000 feet, while in California it is found at 6,000 to 11,000 feet. It grows in the high mountains from the south fork of the Kings River Canyon in California, north through Oregon and Washington, northern Idaho and Montana, into British Columbia and Alaska. Northern exposures are usually preferred because of the cool, moist soil conditions. At high elevations it occurs in mixture with white bark pine, alpine fir, alpine larch and Engelmann spruce. At lower elevations its associates are lowland white fir, lodgepole pine, and western white pine.

The sharp pointed, narrowly pyramidal crowns bear little resemblance to the western hemlock of lower elevations, but it has the same dropping branches and deeply furrowed, dark reddish brown trunk. On steep slopes the trunk may be bent in a wide curve like a sled runner or a great saber. This started when the tree was a slender sapling bent down by heavy snows.

Like other timberline trees mountain hemlock is usually short and distorted, reaching only twenty-five to sixty feet in height and ten to twenty inches in diameter, while those exposed to buffeting winds may be low sprawling trees only a few feet high. On gentle slopes and at the heads of moist valleys, trees seventy-five to eighty feet high are not uncommon, with occasional heights of 100 to 150 feet and diameters of two and a half to three and a half feet. Such trees are undoubtedly of great age, for trees eighteen to twenty inches in diameter are 180 to 260 years old. In contrast to the rapid growth of low country trees,

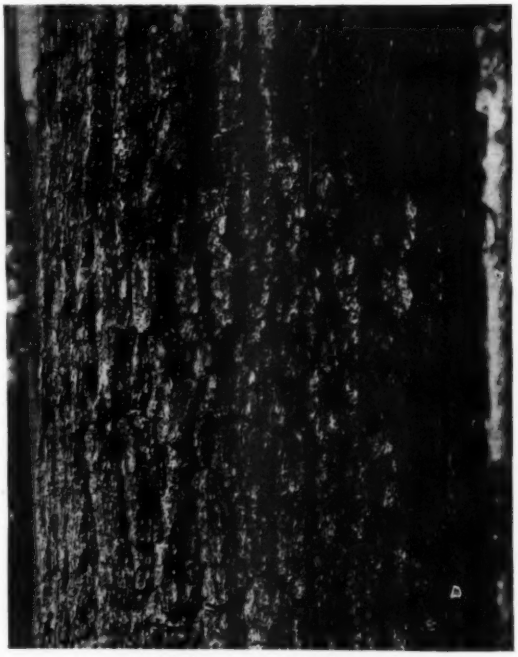
Mountain Hemlock occurs in the high mountains of the Pacific slope

those which grow on wind-swept ridges may take sixty to eighty years to grow five to seven inches in diameter.

The blue-green, bluntly pointed leaves are plump but flat, arranged spirally so as to stand out from all sides of the twig, and range from a twelfth of an inch to an inch in length. Because of the needle arrangement the tree is frequently mistaken for a spruce. Like the leaves of all other hemlocks, each stands on a separate petiole or stem, and unlike the three other American hemlocks, both leaf surfaces are marked with parallel lines of white stomata. The leaves drop off during the third and fourth years.

Purple cones up to three inches long are produced near the branch ends

Richly colored male and female flowers are borne on the same tree. Violet-purple staminate ones hang on slender, drooping, hairy stems of the previous year, while erect lustrous purple or yellow-green pistillate ones appear near the ends of the branches at about the same time. These develop into broad scaled, blunt pointed cones three-fourths of an inch to three inches long. They stand erect until half grown and then become pendulous, ranging in color from yellowish green to a bluish purple. Under each cone scale may be two small, light brown seeds with large wings capable of being carried considerable distances on the wind when they ripen in September or October. Large quantities of seed are produced annually, but relatively few germinate. These will endure shade and suppression for years, and resume normal growth when given full light.



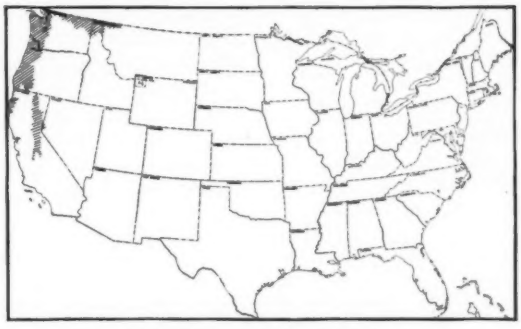
The rich brown, narrowly furrowed bark is an inch or more thick

The dark cinnamon to lavender-brown bark is an inch or more thick, with deep, narrowly furrowed, rounded ridges.

The pale brown to red, close grained, soft wood while light in weight is the heaviest of all the American hemlocks, weighing thirty-three pounds to the cubic foot when air dry. It is without special strength and is only used locally for cabins and rough log shelters.

Mountain hemlock is a tree of unusual beauty suited for ornamental planting in cool moist soils in the northern Pacific States and in the east as far north as Massachusetts. Outside its natural habitat, however, it seldom achieves the grace and vigor of the wild mountain trees.

The name *mertensiana* honors a German physician and naturalist Karl Heinrich Mertens, who lived from 1795 to 1830. *Tsuga* (tsŭ-ga) is the Japanese name for the hemlock genus.



Natural range of Mountain Hemlock in the United States

POLLUTION - - - TOO BAD TO BE TRUE

(*Continued from page* 443)

As early as 1910 stream pollution was reported to have killed as many of our citizens as the scourges of medieval days. Even in 1920 some of our eastern streams were actually void of all fish and plant life and any stream too impure to support fish life should not be patronized by human beings. Ten years ago the situation was alarming; ten years from now what will it be?

The purity of a stream is dependent upon its containing oxygen. Every river is self-purifying and can take a certain amount of pollution in its stride, but when it is overloaded it reaches the danger point. It has a break-down. Too much sewage consumes the oxygen whereupon new bacterial changes occur; instead of purification, putrefaction takes place and the river becomes septic.

A pulp mill pours its wastes into a stream with deadly effect on aquatic life

Most of the minute water creatures upon which fish feed can thrive only in pure water. When a stream goes over to putrefaction and the bottom is covered with slimy ooze all animal and plant life is killed, spawning beds are ruined and the few fish eggs that hatch can find no food. Mature fish can live only a short time in heavily polluted water, for when all dissolved oxygen is gone they are smothered to death, as is a human being when caught in a closed vault. But because of their chemical content, industrial wastes are more directly fatal to fish life than is domestic sewage, while oil covering the surface of a body of water literally asphyxiates every fish and organism beneath it.

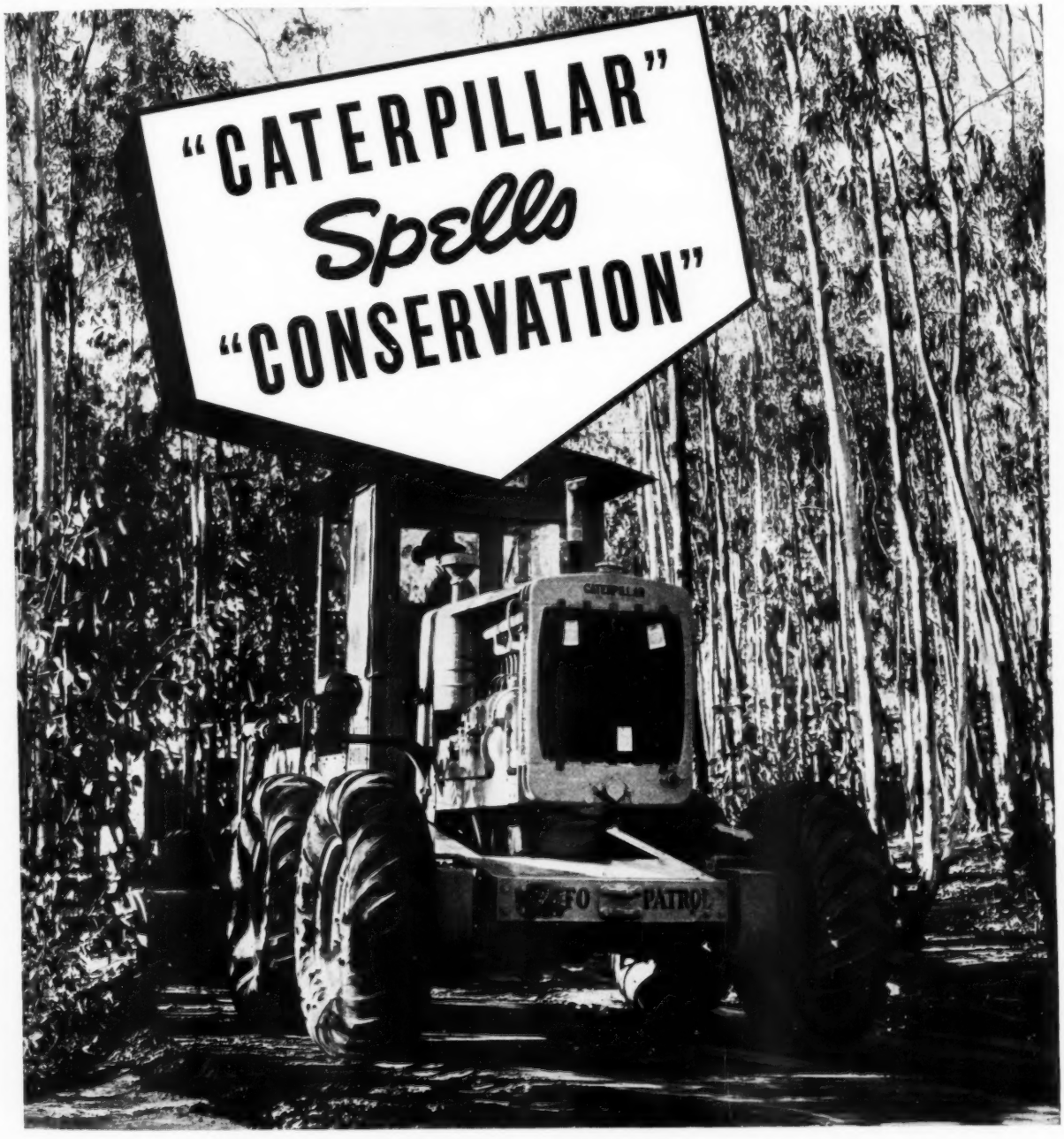
Nature has certain biological principles which, if violated, backfire at the perpetrator as well as the innocent bystander; and we cannot hope to win by fighting them. What success would Luther Burbank have had with his incredible crossings of plants if instead of studying nature's ways he had said: "Nature be hanged! I'm doing this my way!" It seems unbelievable that man, supposedly a reasoning and thinking being, has inhabited this earth so long and has yet to learn that he cannot fight nature and win. Driven to the wall, nature never gives in, she gives out!

The Pilgrims found our rivers and lakes swarming with fish. Later the different varieties were depleted by the greed and carelessness of man and in our day pollution is finishing the job with no one benefited but a few manufacturers. Occasionally a fisherman weeps on your shoulder and relates hysterically of his having witnessed a lone kingfisher or a fish osprey deliberately catch and eat a fish! With the trade wastes of industries killing fish by the thousands, the fisherman's wail is childish and asinine.

In 1915 there were 137,000 acres devoted to oyster beds, but owing to pollution only one-fourth as many as in 1935. Pollution either starves out oysters or bloats them so that they draw tears of joy from the gourmet because of their "fat" appearance. Even when the oysterman who sold them is apprehended it's too late to help the gourmet who has eaten a cool dozen of them. It is fortunate for us that, unlike the Eskimos, we like our fish cooked, because a fish taken from heavily polluted waters not only spoils quickly but if eaten raw, would infect the consumer.

Coastal towns of the eastern states with millions of dollars invested in beach resorts have a severe case of the jitters when health authorities hint that the surrounding waters are becoming unsafe for public use. More than 5,000,000 gallons of sewage daily are released into the New York harbor. Philadelphia discharges an enormous amount into the Delaware River. Several cities pollute the Mississippi.

Human nature is not essentially altruistic and to show how little consideration one city has for another, Chicago many years ago turned the current of its Chicago River directly around, making it flow from Lake Michigan instead of into it; Chicago sewage was (*Continuing on page* 463)



Constructing and maintaining fire-patrol roads through American forests is one of many jobs allotted to "Caterpillar" Diesels in the work of the world. Here is a Diesel No. 11 Auto Patrol, one of a fleet owned by the U. S. Forest Service, at work in the National Forest, San Bernardino, California. They conserve forests and they conserve costs, operating on low-cost Diesel fuel. Willing workers, amazingly able.

CATERPILLAR

REG. U.S. PAT. OFF.

TRACTOR CO., PEORIA, ILL.

WORLD'S LARGEST MANUFACTURER OF DIESEL ENGINES, TRACK-TYPE TRACTORS AND ROAD MACHINERY

Please Mention AMERICAN FORESTS When Writing Advertisers

GOVERNMENT REORGANIZATION PASSES HOUSE AND GOES TO SENATE

With speed characteristic of the last days of Congress, the House on August 13 passed H. R. 8202 giving broad powers of reorganization to the President. The bill had been introduced on August 10 by Representative Lindsay C. Warren of the House Organization Committee, and three days later without public hearings was passed by a vote of 283 to 75 with scarcely three hours of debate. Patterned after the "economy act of 1932," the power of the President to consolidate executive agencies is limited to two years. The bill includes a section for the creation of a Department of Welfare, makes no mention of either a Department of Conservation or Public Works, withholds power to abolish any executive department, and stipulates that the President's reorganization orders will not take effect until sixty legislative days have elapsed. Congress can stop any reorganization order by passage of a bill repudiating it, but the President can veto the repudiation, thus requiring a two-thirds vote of both houses to repass it. Neither the Forest Service nor any other bureau in the Department of Agriculture is included in the list of agencies exempted from reorganization.

This is the second of four bills in which the House plans to divide the President's request for government reorganization. The first, authorizing the President to appoint six special assistants has passed the House, while the other two, providing for reorganization of the Comptroller General's Office and for Civil Service reorganization have not been introduced.

Before the Senate Select Committee on Government Organization during the week of August 2, representatives of national forestry and agricultural organizations presented a united front in opposition to changing the name of the Department of the Interior to the Department of Conservation. The hearings opened four days after the committee met on July 29 and elected Senator James F. Byrnes, of South Carolina, chairman to succeed the late Senator Robinson of Arkansas. After public hearings lasting ten days Chairman Byrnes on August 14 and 15 introduced S. 2969 and S. 2970 to the Senate. This bill like S. 2700 includes no exemption from transfer of the Forest Service or other bureaus of the Department of Agriculture from reorganization. Section 402 which proposes to change the name of the Department of the Interior to the "Department of Conservation" is also retained in the new bill. There is, however, no likelihood that it will be considered before the January session.

Speaking as a former Chief Forester and with the background of nearly a quarter century in the Forest Service, as well as a Director of The American Forestry Association and a representative of the Society of American Foresters, Colonel W. B. Greeley of Seattle urged the elimination of Section 402 of Title IV, which proposes that "The Department of the Interior shall hereafter be known as 'The Department of Conservation'." On the two succeeding days similar requests were made by Louis J. Taber, Master of the National Grange, and James G. K. McClure, Jr., President of The American Forestry Association. Their arguments were supported and expanded by H. H. Chapman, President of the Society of American Foresters; H. A. Smith, President of the Association of State Foresters; and Francis R. Cope, Jr., for the Pennsylvania Forestry Association. Written statements of a similar nature were submitted by the Idaho Chamber of Commerce, the Colorado division of the Izaak Walton League, the Massachusetts Forest and Park Association, the Connecticut Forest and Park Association, the Conservation Association of Los Angeles County, the American Paper and Pulp Association, the California Chamber of Commerce, the Spokane Chamber of Commerce, and others.

During Colonel Greeley's statement the chairman interrupted to say that nothing in the bill provides for either the transfer or the abolishment of the Forest Service. The reply was that an active campaign is now underway throughout the country to the end that the Forest Service and other bureaus may be transferred to the Department of Conservation when created. Specific reference was also made to the proposal of Assistant Solicitor Rufus G. Poole, in charge of legislation for the Department of the Interior, during public hearings on H. R. 5858, before the House Public Lands Committee on June 2, 1937, who offered an amendment for the transfer of the Forest Service to the Interior Department—lock, stock, and barrel. In support of his proposal, Mr. Poole described it as one which he believed to be in furtherance and not in derogation of the President's reorganization recommendations.

President McClure, of The American Forestry Association, not only recommended elimination of Section 402 which would create a Department of Conservation, but also urged that an earlier section entitled "Power of President" be amended to read: "Nothing in subsection (a) shall be construed to authorize the President to abolish or transfer to any other agency any of the functions exercised by the Forest Service, the Bureau of Biological Survey, or the Soil Conservation Service of the Department of Agriculture." In presenting this he reminded the committee that the bill now carries similar exemptions with regard to the Engineer Corps of the Army and the Mississippi River Commission, and that newspaper reports of a month earlier described the original confidential committee print of the bill as also exempting the Forest Service.

In response to a direct request from Senator Byrnes for suggestions from the National Grange, Master Taber enlarged on President McClure's recommendations and suggested this section be amended to read:

"Nothing in subsection (a) shall be construed — to abolish or transfer to any other agency any of the functions of the Department of Agriculture relating to the conservation of the soil or the production and utilization of agricultural crops, including forests, or the administration of the National Forests and wildlife refuges; and in making transfers under the authority conferred by this section, the President shall place in the Department of Agriculture all agencies not now therein which are performing agricultural functions not purely incidental to other major non-agricultural activities."

This "mandatory charter for a unified Agriculture," as described by Mr. Taber, is similar to provisions in the Kleberg bill, H. R. 12498 of the 74th Congress. Similarly, Colonel Greeley expressed the conviction that there should be a national policy established by law, rather than by executive discretion, that the Forest Service should remain in the Department of Agriculture.

Each witness described the close interrelation of farm and forest, placing special emphasis upon the importance of forestry to the farmer. President McClure said: "The interests grouped under the single term *forestry* are more complex than appears on the surface. It would be a comparatively simple matter if the 167 million acres of National Forests ended the administrative responsibilities. But there is more land in farm forests, owned and operated by farmers, than in all the National Forests. Farm forests comprise 185 million acres which must not be divorced from the Department of Agriculture. They are an integral part of each farm all over the United States. Only a step beyond them in close relationship to the fundamental responsibilities of the Department of Agriculture are the 270 million acres of privately owned forest lands operated for commercial purposes.

"Increasing efforts are being made by State and Federal agencies to bring to the farmer the consciousness that his farm woods must be considered as a crop. There are forty-four Extension Foresters in thirty-seven states of the union carrying out this program of education and assistance. These men are on the staffs of the land grant colleges which are in every state in the union and work through the county agricultural agents. To divorce the Forest Service and its related work from the Department of Agriculture would create an inexcusable state of confusion and delay the accomplishments which are universally desired."

In support of the principle that "all land-use problems of whatever kind and character must center in the Department of Agriculture if duplication, overlapping, and waste is to be prevented," Mr. Taber submitted a resolution signed by officers of the American Farm Bureau Federation, the National Cooperative Council, the Farmers National Grain Corporation, the American Agricultural Editors Association, and the National Grange. This he described as the unanimous conclusion of over 3,000,000 rural people.

In conclusion, the witnesses each in their own way urged the committee "to take no action that would continue governmental duplication, extravagance, waste, friction, bitterness, and misunderstanding." They were united in urging that the bill be amended so as to unite the federal agencies on the principle of conservation of natural resources within the Department of Agriculture, and thus end the internecine warfare for jurisdiction.

TRACTOR WEIGHT SAVED

• *means Extra Payload* GAINED

In conservation work, trailbuilding or any other dirt moving operation . . . a tractor moves two kinds of weight—dead load and payload. Tractor weight in itself is dead load. Useful work done is payload. In Allis-Chalmers tractors . . . dead load has been reduced to a minimum through elimination of excess tractor weight. Less power is required to propel the tractor—more power goes to move payload. Power, speed, and weight are all properly balanced for sure, fast-stepping performance. The job "goes faster" because Allis-Chalmers tractors are designed to give maximum performance in the higher speeds—the speeds at which you do 90 per cent of your work. Shown above is the 64 H.P. Model "S-O" Oil Tractor with Gar Wood Bulldozer. Ask for complete information.

BETTER BALANCE • FASTER PICK-UP • HIGHER WORKING SPEEDS

ALLIS-CHALMERS

TRACTOR DIVISION—MILWAUKEE, U. S. A.

CONTROLLED IGNITION OIL TRACTORS

AROUND THE STATES

WISCONSIN ADOPTS FOREST PROGRAM

The creation of State Forests and recreation areas in the Kettle-Moraine area in southeastern Wisconsin is assured by a recent Act of the Wisconsin State Legislature. This levies a tax of two-tenths of a mill on the assessed value of all property, and the accumulated sum, estimated at some $850,000 annually, will be used for forestry and conservation purposes. Of this amount, annual appropriations of $75,000 are "ear marked" for the purchase and development of state forest lands in fifteen southeastern Wisconsin counties.

The money derived under this tax law is "to be used for acquiring, preserving, and developing the forests of the State, including the acquisition of lands owned by counties by virtue of any tax deed and of other lands suitable for state forests, and for the development of lands so acquired and the conduct of forestry thereon, including the growing and planting of trees; for forest and marsh fire prevention and control; for compensation of emergency fire wardens; for maintenance, permanent property and forestry improvements; for other forestry purposes authorized by law and for the payment of aid for county forest reserves." The following counties within which the land is to be acquired are named in the Act: Manitowoc, Calumet, Winnebago, Sheboygan, Fond du Lac, Ozankee, Washington, Dodge, Milwaukee, Waukesha, Jefferson, Racine, Kenosha, Walworth, Rock, and Outagamie.

SENATE APPROVES PURCHASE FOR SMOKY MOUNTAINS PARK

An authorization of $743,265 for the purchase of 26,015 acres to complete the Great Smoky Mountains National Park was approved by the Senate on August 10. The addition is in the form of a "rider" to S. 2583, to provide for the purchase of lands to add to the Tahoe National Forest, in Nevada.

The Great Smoky Mountains National Park was originally conceived to be a tract of 704,000 acres to be donated to the Federal Government in more or less equal portions by Tennessee and North Carolina. After 150,000 acres were acquired it was agreed that the area would be administered and improved by the National Park Service. By Act of June 15, 1934, the minimum area of the park was reduced to 400,000 acres. Since passage of the enabling act of May 22, 1936, there have been acquired and accepted 383,358 acres, leaving 53,336 acres to be acquired. The lawsuit which has tied up 27,320 acres for a number of years has been adjusted, and from other sources it is learned that the Third Deficiency Appropriation bill is expected to carry some $65,000 to reimburse the owners of this Morton-Butler tract for interest on their investment during the delay.

According to Senator McKellar, of Tennessee, the two states secured $4,875,000 by state bond issues, land donations, and private contributions with which to match a gift of $5,000,000 given in memory of Laura Spelman Rockefeller. Then followed the depression and inability to collect some $300,000 of the private pledges, leaving a portion of the Rockefeller money unmatched. In addition, the cost of some of the lands was higher than had been estimated.

"In these circumstances," according to the Senator, "the President, by Executive Order of December 28, 1933, allotted $1,550,000 for land acquisition for CCC purposes, which, plus the $500,000 of Rockefeller funds, made available $2,050,000, the amount then considered necessary to acquire all the remaining lands in the park area, the estimates of the states being $2,004,368.

The estimates proved too low, leaving 26,015 acres to be acquired in Tennessee. With the approval by the House of $743,265 voted by the Senate, the total area of the park will be 436,695 acres and it will be ready for formal acceptance by the Federal Government. The total cost of acquiring the land, originally estimated at $9,750,000 will have been over $11,868,000, including Federal contributions of $2,293,265.

COLONEL W. B. GREELEY

Appeared before Senate Committee to oppose transfer of Forest Service. See story on page 454.

35,000 TREES FOR FARM FORESTS

Thirty-five million trees were distributed through federal and state cooperation to farmers for planting farm forests, groves, windbreaks and shelterbelts in 1936.

These trees were produced largely in state nurseries maintained in cooperation with the Forest Service under the Clarke-McNary Forest Law, together with 156,000,000 other trees grown for planting on state and private forest lands, including erosion control projects employing Civilian Conservation Corps labor. More than 9,000,000 more trees were distributed to farmers than in 1935, indicating a general expansion in farm forest planting.

New York farmers held a slight lead in planting, closely followed by those of Arkansas, Ohio and Georgia with from 3,000,000 to 4,000,000 for each state.

Eight million trees were distributed to state lands, 18,000,000 for large private plantings, and 128,000,000 for planting by the CCC.

Translated into area, this means that approximately 190,000 acres of private and state cutover forest, old burns, and gullied and abandoned farmlands were reforested with trees from the cooperative State-Federal nurseries.

30-DAY DUCK HUNTING SEASON

A thirty-day duck hunting season this year with changes in dates and zones was announced early in August by the Department of Agriculture. The previous two seasons also were limited to thirty days in order to cut down the annual kill and speed up the Department's waterfowl restoration program.

In the northern zone the season on ducks, geese, Wilson's snipe (jacksnipe), and coot opens October 9 and closes November 7. In the intermediate zone the season is November 1 to 30, and in the southern zone, November 27 to December 26. Dates are inclusive.

States in the northern zone include Colorado, Iowa, Kansas, Maine, Massachusetts, Michigan, Minnesota, Montana, Nebraska, New Hampshire, New York (except Long Island), North Dakota, Ohio, Oklahoma, South Dakota, Vermont, Wisconsin, and Wyoming.

In the intermediate zone are Connecticut, Delaware, Idaho, Illinois, Indiana, Kentucky, Missouri, Nevada, New Jersey, New Mexico, Long Island of New York, Oregon, Pennsylvania, Rhode Island, Utah, Washington and West Virginia.

The southern zone includes Alabama, Arizona, Arkansas, California, Florida, Georgia, Louisiana, Maryland, Mississippi, North Carolina, South Carolina, Tennessee, Texas, and Virginia.

Other restrictions are summarized as follows:

Continuation of the regulation providing no open season on snow geese and brant in Florida and in states north thereof that border on the Atlantic Coast, and no open season in any part of the United States on Ross's geese, wood ducks, ruddy ducks, canvasbacks, redheads, bufflehead ducks, and swans.

Bag and possession limits, continued from the last two seasons, place the daily bag limit on ducks at ten in the aggregate and make the possession limit conform to the daily bag.

The daily bag and the possession limit on geese and brant of the kinds permitted to be killed have been increased this year to five in the aggregate of all kinds. The new daily bag limit on coot is twenty-five.

Baiting of waterfowl and doves and the use of live decoys in hunting waterfowl are not authorized regardless of the distance between the bait or decoys and the shooter.

The three-shell limit on *repeating* shotguns, either hand operated or auto loading, in effect the last seasons, is continued this season. Hunters may use shotguns not larger than No. 10 gauge.

Waterfowl and coot may be hunted in season from 7 A. M. to 4 P. M. Snipe, rails, gallinules (other than coot), woodcock, mourning doves, white-winged doves, and band-tailed pigeons may be hunted in season from 7 A. M. to sunset.

DR. HENRY S. DRINKER DIES

Dr. Henry S. Drinker, of Merion, Pennsylvania, president of The American Forestry Association from 1917 to 1923, died following a brief illness on July 27. He was eighty-seven years old.

Always actively interested in forest conservation, Dr. Drinker, during the period he was president of Lehigh University, from 1905 to 1920, established a department of forestry at the school. This department had extensive experimental forestry stations near the University, together with an arboretum that contained species of every tree found in Pennsylvania.

Previous to his election as president of The American Forestry Association, Dr. Drinker was vice-president of the National Conservation Congress.

DR. HENRY S. DRINKER
1850-1937

Born in Hong Kong, China, Dr. Drinker began his career with the Lehigh Valley Railroad. Later he studied law and became solicitor general for the railroad, serving in this capacity from 1885 to 1905, when he accepted the presidency of Lehigh University.

He took a keen interest in developing a system of military training in colleges and universities and was president of the National Reserve Corps from 1913 to 1916 and chairman of the board of directors of the Military Training Camps Association from 1916 to 1919. He was honorary president of the latter organization in 1920.

He received honorary degrees from Lafayette, Franklin and Marshall, the University of Pennsylvania, Princeton, and Moravian College.

WALLACE MERGES LAND ACTIVITIES

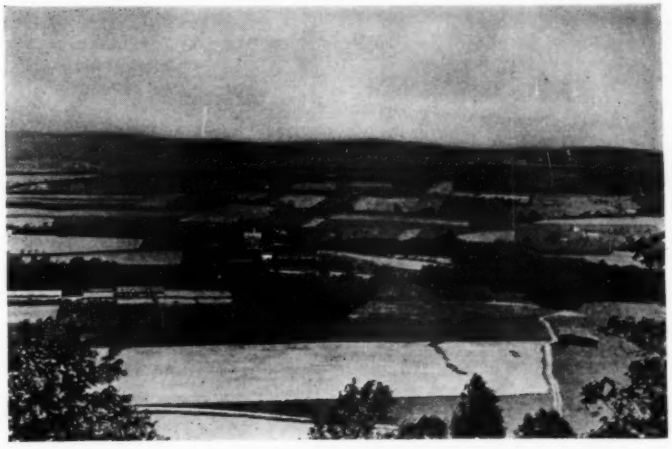
All land use activities of the Department of Agriculture—flood control, erosion work, forestry, soil surveys and purchase and use of land—have been placed under a single head.

An order from the Secretary designated Milton S. Eisenhower co-ordinator of land use planning.

Wallace acted, associates said, to place the Agricultural Department in a position to carry out any large flood relief or similar program Congress may approve.

There has been spirited rivalry between the Interior and Agricultural Departments in recent years over overlapping land functions.

Mr. Eisenhower, a native of Kansas, entered the Agricultural Department more than ten years ago as an assistant to Secretary Jardine.



LAND CONSERVATION IS REALLY LAND MANAGEMENT

Not merely farm land—Conservation includes forestry, drainage, flood control, erosion control, stream control, fish ponds, fire lanes and roads.

Steadily, Conservation improves the picture in all kinds of land. Explosives, as a form of easily transported power, are almost indispensable aids to Conservation. Easily used and easily carried, they simplify many Conservation problems.

Atlas has made real contributions to effectiveness and safety in the use of Explosives on Conservation jobs. Not only with standard grades of dynamite, but Atlas Farmex Stumping and Atlas Farmex Ditching dynamites, along with the Atlas Accordion Fold Electric Blasting Cap, are known and accepted as standards throughout the country.

ATLAS POWDER COMPANY, WILMINGTON, DEL.

Cable Address—Atpowco

Everything for Blasting

OFFICES

Allentown, Pa.	Joplin, Mo.	New Orleans, La.	Pittsburgh, Pa.	Spokane, Wash.
Boston, Mass.	Kansas City, Mo.	New York, N. Y.	Portland, Oregon	St. Louis, Mo.
Butte, Mont.	Knoxville, Tenn.	Philadelphia, Pa.	Salt Lake City, Utah	Tamaqua, Pa.
Denver, Colo.	Los Angeles, Calif.	Picher, Okla.	San Francisco, Calif.	Wilkes-Barre, Pa.
Houghton, Mich.	Memphis, Tenn.	Pittsburg, Kansas	Seattle, Wash.	

ATLAS EXPLOSIVES

CHEMICALS ATLAS EXPLOSIVES

GROW TREES FROM SEED

Sow about 3/8-inch deep in a protected part of garden or cold frame.

The Following Varieties are Available in 25c Packets
(Postpaid in U. S. A.)

Oriental Spruce	Austrian Pine	Pitch Pine
Colorado White Fir	Corsican Pine	White Pine
White Spruce	Red Pine	Scots Pine
Norway Spruce	Yellow Pine	Jack Pine
	Swiss Mt. Pine	

Correspondence With Collectors Invited

HERBST BROTHERS
Tree and Shrub Seed Specialists
92 WARREN STREET NEW YORK, N. Y.

NEW BOOKS

THE TRADER'S CHILDREN, by Laura Adams Armer. Published by Longmans, Green and Company, New York City. Price $2.50. 241 pages. Illustrated.

It is nice to review Mrs. Armer's new book of folk lore and modern commentary concerning Navajo land in our great southwest in the same issue with Mr. Musgrave's article on the same locale. To find books of authoritative information which delight children and charm adults is a rare thing. Mrs. Armer's "The Trader's Children" and other books should be available to all young Americans to satisfy their curiosity about Indians today, the desert country and its prehistoric relics, and its present-history effort to bring back the grasslands through the Soil Conservation Service.

The Trader's children are four, fine, healthy, white folks photographed in various activities outdoors and in, to illustrate the narrative. Their life with the familiar birthday celebrations and holidays in a land of new realities of drought, storms, and scarcity brings a new sense of values more fascinating than a fairy story because it is "really and truly." The superstitions of the Indians are accepted and explained simply. Children who enjoyed the preceding volume, "Waterless Mountain," will recognize the background with delight, but it is in no way a sequel.

Horned toads and desert flowers, cloudbursts and dam construction, Indians and Spanish Americans all find their place in this story of truth and beauty.——J. C. C.

CCC FORESTRY, by H. R. Kylie, G. H. Hieronymus, and A. G. Hall. Illustrated. 335 pages. United States Government Printing Office. $1.00.

A modern forestry primer, well bound and attractively illustrated, has appeared for use by men in CCC camps, but so authoritative and so easy to read that it will be widely used.

Marginal sketches adorn each page, helping to make graphic the factual information on forest planting, silviculture, timber measurements, forest uses, and protection. This book marks a new epoch in government publications. The authors have broken loose from the traditional bonds which have circumscribed the usual bulletin and have marshalled their facts in a truly readable manner, and presented them in a book so attractive it will command a place in the library of every person interested in forestry.—G. H. C.

THE NILE, by Emil Ludwig. Published by The Viking Press, New York. 619 pages. Illustrated. Price, $5.00.

The Nile, greatest single stream on earth, mighty artery of life to a vast land and people, has and undoubtedly will continue to be the river of rivers to the serious student of conservation. Why? Mr. Ludwig tells you on the first page of this magnificent book: "It (the Nile) flows through the desert; for half of its course it receives neither tributaries nor rain, yet it does not dry up; indeed, close to its end, it creates the most fertile of all lands. In its youth it dissipates its finest powers, yet it arrives at its mouth with might . . .

"Its basin contains the biggest lake of the eastern hemisphere, the highest mountains . . . . Its banks are peopled by the richest bird life of the northern hemisphere, by nearly every animal species known to Paradise, by vegetation ranging from Alpine flora and the tropical forest, through swamp, steppe, and desert to the richest arable land on earth. It feeds hundreds of different races . . . The struggles of these men for power and wealth, for faith and custom, for the supremacy of colour, can be traced farther back here than anywhere else in the history of mankind—for six thousand years."

This life story of a river is in reality the life story of conservation. To read it is to understand, at last, the truly basic laws of conservation, to realize, as Mr. Ludwig realized "That all these phenomena, which reflect the power of nature, the activity of its creatures, the strivings of its human beings, agriculture and plants, animals and people, scenery and history, would not have been what they were and are were it not for the river." There is the story of conservation. And conservationists of the world should thank Emil Ludwig for writing it so beautifully for them.—E. K.

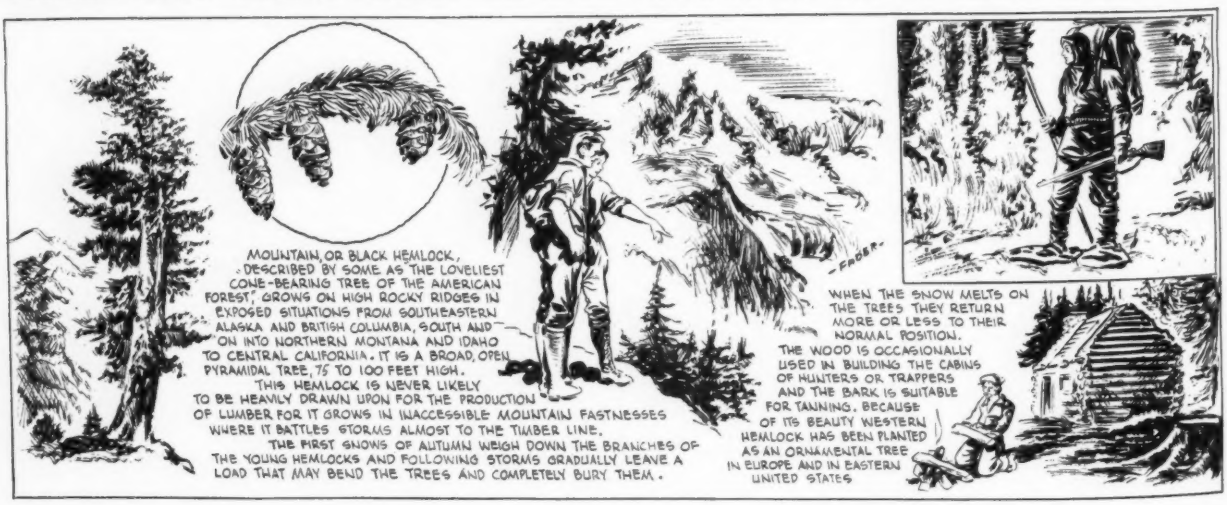
MORNING FLIGHT—A Book of Wildfowl, written and illustrated by Peter Scott. Published by Charles Scribner's Sons, New York City. 138 pages. Price $10.00.

Printed first in 1935 as a limited signed edition, *Morning Flight* went out of print almost on publication. But the same material, with the exception of a couple of colored plates, is embodied in this first ordinary edition. The author is the gifted son of Capt. Scott of the Antarctic and Lady Hilton Young, the sculptor. He introduces his book as "a book of pictures"—which indeed it is—pictures of wild geese, ducks and shore birds—wings against the sky, paintings inspired by the adventures of a few years in the Anglian marshes, shooting, catching, taming and photographing "the most wonderful birds that fly." The episodes—simply set down by a true artist and lover of the wild, one almost experiences with him, and they companion perfectly the exquisite beauty of the illustrations.—L. M. C.

LET'S GO TO THE PARK, by Raymond C. Morrison and Myrtle E. Huff. Published by the Wilkinson Printing Company, 1717 Wood Street, Dallas, Texas. 172 pages. Illustrated. Price, $3.00.

"Let's Go to the Park!" It doesn't matter where—but into the open where there is room to stretch,—where there are things to see, and the great arch of sky above. The story of parks—village and city, state and national—their purposes and their uses is told with many pictures and few words by Raymond C. Morrison, City Forester of Fort Worth, Texas, and Myrtle E. Huff of Columbia School in Elgin, Illinois. It is a record of man's increasing appreciation of the outdoors. Let's go! —G. H. C.

TREES AND THEIR USES—No. 28—MOUNTAIN OR BLACK HEMLOCK


MOUNTAIN, OR BLACK HEMLOCK, DESCRIBED BY SOME AS THE LOVELIEST CONE-BEARING TREE OF THE AMERICAN FOREST, GROWS ON HIGH ROCKY RIDGES IN EXPOSED SITUATIONS FROM SOUTHEASTERN ALASKA AND BRITISH COLUMBIA, SOUTH AND ON INTO NORTHERN MONTANA AND IDAHO TO CENTRAL CALIFORNIA. IT IS A BROAD, OPEN PYRAMIDAL TREE, 75 TO 100 FEET HIGH.
THIS HEMLOCK IS NEVER LIKELY TO BE HEAVILY DRAWN UPON FOR THE PRODUCTION OF LUMBER FOR IT GROWS IN INACCESSIBLE MOUNTAIN FASTNESSES WHERE IT BATTLES STORMS ALMOST TO THE TIMBER LINE.
THE FIRST SNOWS OF AUTUMN WEIGH DOWN THE BRANCHES OF THE YOUNG HEMLOCKS AND FOLLOWING STORMS GRADUALLY LEAVE A LOAD THAT MAY BEND THE TREES AND COMPLETELY BURY THEM.
WHEN THE SNOW MELTS ON THE TREES THEY RETURN MORE OR LESS TO THEIR NORMAL POSITION.
THE WOOD IS OCCASIONALLY USED IN BUILDING THE CABINS OF HUNTERS OR TRAPPERS AND THE BARK IS SUITABLE FOR TANNING. BECAUSE OF ITS BEAUTY WESTERN HEMLOCK HAS BEEN PLANTED AS AN ORNAMENTAL TREE IN EUROPE AND IN EASTERN UNITED STATES
FRASER

CAMP WATCHING

(*Continued from page* 433)

The pigs broke in on the brook's song. Boorish fellows who would shatter a camp watcher's reverie. But pigs well understand time and they know when supper is due. My watch said six o'clock.

I shook the spell of the brook from me and went to the cookhouse. Then I took the yoke and carted two brimming pails of stuff down to the pen. They grunted and woofed as they heard me coming down the trail, and they wallowed in the trough as pigs will.

Back at the cookhouse I found that the cook had left me a fine cake as a surprise. There were some dried-apple pies, too, and a plate of cold meat. On the stove there still sizzled a large pot of tea, nearly lye now. I drank some tea and nibbled at the cake and meat, but the silence of the place had affected my appetite.

It was too late to wash dishes. I stacked them and went outside. On the steps I was greeted by a dozen cats, all mewing, their tails straight in the air. They had heard my rattling of dishes. I remembered then that the cook always had a mess of cats around the place although they had never come into my life at all. Yet here they were and a camp watchman had to do something about it. I found a can of condensed milk, watered it, and poured the product into three pie plates. The combined purring was like the hum of a far-off airplane. It sounded good and I understood why the cook had fed them.

The sun dodged behind the mountain and shadows fell swiftly. It was time, if I were a camp watcher, to start watching camp.

Through the empty bunkhouses I trod with quiet feet. Silence everywhere. The kind of silence that makes you tread softly and eventually makes you talk to yourself. Here was a new shirt laid out on a bunk; Al Jameson had forgotten it in his hurry to catch the train. On another bunk was a pair of obviously city shoes. A copy of *Svenska Amerikana Posten* for June 20th lay on the table; Larson, the bucker, would regret that, I thought. Here and there was a half-used box of tobacco or snuff.

I closed the doors of the ten shacks and went to the bath-house where we washed ourselves and our clothes. I found the great barrel stove still warm, a few bright embers glinting at me through the bars of the grate. The logger's washing machine—a stick with the perforated tin can nailed to one end of it—lay in the center of the room. Just as I turned to leave the place, I got a start when I nearly stepped on something. It was a very large and very green frog, looking up at me with appraising eyes.

So this was why they had camp watchmen. Loggers away from camp less than two hours and here was an amphibian in the wash-house. I sat down on a stool to consider the matter. What would old Jim LaVoie have done under like circumstances? The frog eyed me steadily and without blinking. Presently he yawned slightly and hopped onto the woodpile in the corner. I tip-toed out the door and closed it.

The moon was just rising; and piercing it were the ghostly figures of two black and gnarled snags. One of them crossed the yellow disc with its monstrous arm, and to me it appeared as though the ancient stump was asking silence. Was I getting the jumps already? I decided to go to my shack where a large Rochester lamp was burning.

My bunk was cheery enough. The round lamp sizzled and sang like a teapot. It smelled, too, but it gave a genial light. I kicked off my pants and lay down to read. Now, as though by some prearranged plan which had only awaited my crawling into bed, the silence was broken and the night noises began.

The door was open and at first it was the creek with its incessant babbling which broke in upon my reading. The gurgle, gurgle of it pounded into my head. The night bugs took up their chorus. There were many kinds of them and they played a loud and continuous opera. Some sort of a bird—a night hawk, no doubt—wheeled unseen around the camp, whistling ever so softly, yet ominously as though in warning. A solitary fox barked twice. A slough of wind, now rising and falling, made the fireweed scrape across my window. Comfort came occasionally when one of the pigs gave a satisfied grunt. These grunts helped me immensely. If a pig could be content, why not I?

The miserable type began to dance before my eyes and I turned out the light. I was just dozing into sound sleep when I heard a noise in the direction of the wash-house. First a thump, a wicked, resounding thump like that of a large body striking fair against an unmovable object. I sat up straight in bed. No frog, surely, could have made such a noise. Then there came through the forest night a crunching, crunching.

I got to the edge of the bed. Yes, I was the camp watchman and it was my duty to protect the camp. The crunching continued. I took my flashlight and a .22 caliber revolver and went out into the camp street. As I crept toward the wash-house I remembered that no real woodsman shot until he could see the whites of their eyes. I resolved to be careful.

The shadow of a bunkhouse shielded me as I turned the corner. There I could see the wash-house, its board sides reflecting the sickly rays of the failing moon. From within came savage noises; crunching, woofing and other weird sounds, like elephants running wild. Or was it a catamount? I couldn't tell. The memory of old Jim LaVoie helped me and I walked bravely to the door, opened it and peered in. In a corner I saw two figures. Flashing my light I discovered two large hedgehogs, dining on the fir wall. One of them squealed slightly, but moved not. The other regarded me with philosophical interest, but with no fear. I picked up a piece of wood and heaved it. The two porkies ran clumsily out through a loose board. I closed the door and went back to my bunk. I felt I had the situation well in hand.

When I awoke the sun was beating down into camp. The sky was blue and the mountain fairly danced in the sun. The brook seemed laughing. I washed in cold water and went to the cookhouse where I breakfasted on left-over beans and Swedish hardtack. The cats mewed and I fed them. Then I filled my pipe and sat down on the deacon-seat in the sun. Crows were making a great hubbub. A chipmunk scurried across the wood-yard. I could hear the pigs grunting and snorting, clamoring for their breakfast. A flicker clattered away on a tall spruce on the edge of camp. My pipe smoke curled blue rings in the clear, quiet morning air. No incense ever smelled so sweet. Watching camp, I decided, was a pretty good job. I doffed my hat in memory of old Jim LaVoie and went to feed the pigs.

For every job in the protection, preservation and management of the forest there is a dependable TRUE TEMPER Tool.

THE
AMERICAN FORK & HOE COMPANY
CLEVELAND, OHIO
Makers of Essential Tools

Write today for 32-page Handbook describing this famous line of essential tools It's free.

Idaho School of Forestry

University of Idaho
Moscow, Idaho

Offers thorough training in technical forestry, preparing for Federal, State and private work.

Four and five year courses, leading to the degrees of Bachelor of Science in Forestry and Master of Science in Forestry respectively.

Opportunity is given to specialize in forest production, wood utilization and range management.

Large logging and milling operations, important wood-working industries and extensive Federal, State and private forests are near at hand; 7,000 acre experimental forest 15 miles from campus. Excellent opportunity for summer employment.

Catalog Free

WHITE MAGIC IN NAVAJO LAND

(*Continued from page* 431)

by the medicine man's nephews joined the working crew.

It was not surprising, then, that he appeared oftener and oftener at the scene of operations; and as he began to understand what it all meant, the more it fascinated him. He deigned to shake hands with the white Natahni when they met the day the dam was completed, and boldly asked questions.

"The water," said Natahni, "may be a friend or an enemy. Keep it tame, and it will work for you; if you let it run wild, it is *chindi* (a devil) and may destroy you. These streams were once friendly; they watered your hills, and your gardens and your plains. But you didn't take care of those things. You call the earth female, the mother of all, and you know that when the sun and the rain fall upon her she becomes fertile. But this earth must not be abused or she will no longer produce. Here we are catching the water that has been rushing over the land carrying away the best soil. This soil that is carried off is three times better than that which is left behind. We have measured the good soil, or silt, that the water carried across our area and away to the Colorado River. It is over 800,000 tons in one year!" He measured with his hands the space of a foot in thickness and then measured again on the earth a space that showed approximately how much earth erosion was claiming. Old Hosteen gasped in amazement.

With the aid of several good summer rains, the white man's magic worked miracles. No longer did the water rush off in a muddy torrent. Caught by different devices, it was held, turned or spread at will. It distributed slowly its load of silt over a large area, seeped into the earth and only a little was left to go on to the river. Hosteen had noticed how simple these devices were. He had always thought that the white man must have heavy machinery, and steel and concrete for his work, but Natahni used chiefly the things that were to be had right there on the Indian Reservation, and the work was done with the simplest of tools and all Navajo labor. His work was something that almost any Navajo could do himself in a smaller way on his own place. Dikes and dams were of earth where possible; native rock, rolled in mesh wire often formed a firm core in an earthen spillway; even mesh wire fences served as spreaders, catching great piles of tumbleweeds against them through which water seeped, leaving a part of its heavy silt deposit back of the fence.

Riding past the Deer Springs Diversion Dam just three months after its completion, Hosteen saw a field of bright green grass ending abruptly at the edge of the irrigated section. He learned from Beni Tahe that 435 acres were irrigated from that one dam, and he quickly thought of the several large dams and the many small ones in the big area inside the steel fence and those that had been made in other places. That would mean that several thousand acres of the Navajo country would be under flood irrigation. When he heard later that the white magicians had cut the grass from ten small plots in the irrigated section and were going to weigh it and compare it with that cut from ten similar plots outside the irrigated land, he jumped on his buckskin and dashed up to Natahni's office to see the result. When it showed ten times as much, he grinned broadly. Hadn't his teams helped to make this possible? He also heard them say that there was so much of this tall grass that they were cutting it for winter feeding—a ton of hay to the acre!

While he was in the office he heard talk of an agricultural fair to be held on the area at harvest time. Anyone might enter into competition for the small cash prizes, and he understood that excitement was running high over corn, melons and pumpkins. A surreptitious visit to garden patches showed Hosteen that there was indeed a great deal about which to get excited. He was especially interested in the corn. Only the old Navajo strains were being cultivated, as Natahni said it was good corn and was already adapted to local conditions, but that raised on the little irrigated experiment plots at the station and that in the patches of Indians who were fortunate enough to be accessible to flood waters spread by the dam had nearly four times as much as the corn in the other places. Hosteen Nez Begay was beginning to feel sorry for the Navajos who were not in on the project!

Beni told Hosteen that more corn than was needed was being raised on the project and that they were storing the surplus in a silo. This silo was really a pit or trench like one any Navajo could dig near his own field, and into it they had put forty tons of green cornstalks with the ears still upon it and to it they had added sorghum from a four-acre field. They had wet it down and covered it up with earth. Early next spring before the grass began to come up, the pit was to be opened and the ensilage fed to the stock. Hosteen had laughed at this, for the idea was new to the Indians. They all

FALL PLANTING'S HERE!

And it is preferred by many to spring planting. We offer some really surprising bargains this fall — more than a thousand evergreens, trees and shrubs to choose. Some are scarce and will be sold out by spring.

OUR AUTUMN CATALOG
gladly mailed on request. You will find, quality considered, you can buy cheaper and safer from us.

EVERGREEN BARGAINS

	25	100	1000
White Spruce (Picea alba) XX	$3.00	$11.00	$75
Hemlock (Tsuga canadensis) X	5.00	17.50	150
Douglas Fir (Pseudotsuga) XX	5.00	17.00	110
Red Pine (p. resinosa) XX	.....	8.00	55
Scots Pine (p. sylvestris) XX	.....	11.00	95
Japan Yew (taxus cuspidata) for hedges			
10-12 in. XX	10.00	36.00	300
2-2½ ft. XXX	16.00	55.00	430

RARER TREES (ball of earth)

	Each
Red-Flowering Dogwood—	
12-18 inches, 2-yr. grafts	$ .90
18-24 inches, 3-yr. grafts	1.25
Pfitzer (silver) Juniper	1.00
Franklinia (Gordonia)	1.25
Koster Blue Spruce	1.90
Kelsey Berry-bush Yew	3.00

BULBS AND PLANTS

TULIPS & NARCISSUS from $4 a 100! Not any "bargain assortment" but strict top-size, named bulbs.

IRIS—from 2 for 25 cents—your selection of 100 varieties.

PEONIES—The best in the world and described so you can select easily.

KELSEY NURSERY SERVICE

Established 1878 — 50 Church St., New York, N. Y.

thought it would rot and no one could picture stock eating such stuff. But sure enough, in the spring of 1936, Hosteen himself saw some forty-nine of the Navajo sheep led to the ensilage trough. Each grabbed a bite and ran around wildly bleating and looking for more. After a time they seemed to learn where it "grew," and crowded around the trough jostling each other and reaching for more. White magic worked even on dumb animals, it seemed! This was not the first time the white man had bewitched the sheep. Last year Natahni had even made the animals help in planting more feed for themselves. Hosteen had laughed when Beni told him about that.

"When the seeds of the grass growing on the steep sides of the mountains were ripe," he said, "Natahni told us to bring 500 of our sheep and turn them loose on it for two months. Of course they ate a lot and got fat. They didn't know they were working, but while they walked around feeding, the seeds stuck in their wool, and later these seeds dropped onto the earth and were covered up by the trampling feet of the sheep. Then we took the sheep out of these places. The next spring we saw plants coming up in places which had been bare the year before."

When the fair opened, Hosteen was the first to enter the Chapter House where the exhibits were placed. The walls were hung with rugs, marvelous art products from the looms of the Navajo women; there was a fair display of jewelry made by local silversmiths; but the show was chiefly agricultural. The old man passed from table to table, slowly, pausing longest before mounds of corn, dark red, or white, or pink, or lavender, or black, or ears with all these colors incredibly mixed together. "They look like jewels," he heard a Belicano (American) say. "Yes," answered the staff agronomist, "and it's very good flour corn. It makes delicious roasting ears, the stock like it, and it is easier than flint corn to grind on the metates (grinding stones). Look at the length of the ears—some of them are sixteen inches long!" Hosteen felt very proud indeed.

Then he went outside to see the stock show—two fine Morgan stallions bought by the Indian community for breeding purposes; a few of the fat Herefords and Rambouillets. Then a sight caught his eye that made him smile. In a pen all to himself was a magnificent old white ram. He held his head with its four great horns high, as if realizing that he was a prized specimen of a doomed race. In an adjoining enclosure were ewes—white, black, and brown. They, too, were plump, and Hosteen felt a glow of pride, for here were native Navajo sheep at their best. But why were they here?

Natahni approached and he was explaining to some people with him. "No other sheep," he said, "can produce wool so suited for the weaving of Navajo rugs. It is not so oily as other wools and can be washed by the women more easily. It is not too fine. We have looked all over the Reservation and have bought the very finest of these native sheep. They will be kept in pastures by themselves and will be used exclusively for rug wool."

These white men had thought of everything, it seemed to Hosteen. This thing they called "science," this selective breeding of plants and animals, was "good medicine" after all. He went over to Natahni and, in the presence of a dozen Navajo men, he patted the white man's shoulder.

"You do fine things for my people," he said. "We did not understand at first. We had been given many promises by white men, some of them good men, too, we think, but they made as many mistakes as we did. We thought we couldn't believe anybody.

"But this is good," he waved his arms to include the whole thing. "Much grass grows for our sheep and ponies. The water is now our friend. You are making the trees grow again where long ago there were forests. We have learned how to farm the land. We raise beans, peas, wheat, oats, barley, and alfalfa, as well as corn. We make more money than we made with just our sheep, and we will not injure the land. We will be happy when all of us have learned this.

"Soon," he continued, "we shall be singing the mountain chant. I will make beautiful sand paintings. You come, I show you."

Here his bright eyes caught a glimpse of a visitor who had come to the fair with his kodak and was snapping the medicine man in the midst of his harangue. He pulled Natahni into the picture with him.

"Both make medicine," he said. "Both friends!"

REUNION OF FORESTRY ENGINEERS

In connection with the National Convention of the American Legion in New York City, September 20 to 23, it is proposed to hold reunions of the 10th and 20th Engineers (Forestry), according to Major John D. Guthrie, of the United States Forest Service, Washington, D. C.

It is urged that any 10th Engineers planning to attend this reunion, whether a Legionnaire or not, should inform one or both of the following: Frank E. Mullen, NBC, 30 Rockefeller Plaza, New York City, and Frank S. McNally, Sherman Lumber Company, 5728 Grand Central Terminal, New York City.

150 GALLONS per Minute — with this Portable Automatic Priming Pump —

(Heads up to 60 ft.)

Jaeger "Bantam Weight," built of Aluminum and Alloy Steel, gives you the huge water volume of a centrifugal, plus fast, 100 per cent automatic self-priming, plus light weight and compactness for easy carrying. Passes mud, sand, small stones, pumps dirty water easily.

One of a complete line by world's largest makers of self-priming centrifugals. Write today for catalog, prices. Distributors in every city.

THE JAEGER MACHINE COMPANY
525 Dublin Avenue Columbus, Ohio

University of Maine
Orono, Maine

The Forestry Department offers a four-year undergraduate curriculum, leading to the degree of Bachelor of Science in Forestry.

Opportunities for full technical training and for specializing in forestry problems of the Northeast. Eight-weeks' camp course required of all Seniors in Forestry, in practical logging operations, on Indian Township, Washington County, Maine, under faculty supervision.

For catalog and further information address

FORESTRY DEPARTMENT
University of Maine
ORONO, MAINE

SINGLE & DOUBLE BIT
AXES
ALL PATTERNS
◆
HIGHEST QUALITY FOR THE LAST HALF CENTURY

ALL KINDS OF
LOGGING TOOLS
CHAIN HOOKS, SWIVELS, COLD SHUTS & EVERY TOOL KNOWN FOR LOGGING. ALSO PULASKI MULTI-USE TOOLS

WARREN AXE AND TOOL CO., Warren, Pa.

NEW UNIFORM FABRICS

Regular Personnel
U. S. Forest Service

We can now furnish uniforms of any one of the five new fabrics. Perfectly tailored to-your-individual measurements. Guaranteed to fit!

Write for Samples and Prices.

The Fechheimer Bros. Co.
Uniforms For Over A Half Century
CINCINNATI OHIO

NATURAL BRIDGE of VA.
ONE OF THE SEVEN NATURAL WORLD WONDERS
COTTAGES $1.00 Double Rooms per Person
HOTEL $1.50 and up
NATURAL BRIDGE, VIRGINIA

Genuine AL WILSON

World famous trolling, casting spoons. Sample prices: 4B—35c; 5B—50c; 5½B—55c; 6B—65c. Send for 1937 catalog. Accept only the Genuine.
Manufactured only by
AL WILSON COMPANY
1539 Folsom Street San Francisco

See D. B. SMITH Ad on Page 423

HUNTING BEE-TREES

(*Continued from page* 449)

It calls for a silly-looking but efficient little contraption known as a "bee box," which may be variously contrived. Probably the simplest way to make such a contraption is to take an ordinary cigar box and cut a circular hole about the size of a half-dollar in the top; place a tin slide or shutter over this opening to permit its being closed at the will of the operator. On the cover attach a smaller box, something like a chalk container, from which the bottom has been removed. Arrange a sliding glass cover for the second box, and your equipment is ready.

Now place a piece of empty comb or small bee-feeder containing sweetened water or diluted honey in the cigar box. Put a few drops of oil of anise into the sweetened water or on the comb, and smear a little of the oil inside the cigar box.

Thus appointed, the hunter betakes himself to bee-tree territory and exposes his bait. Or he may capture a nectar-gathering bee that he chances to see, enclose the bee in the cigar box and close the slide. The imprisoned bee is held in the lower compartment until he has had an opportunity to fill up on the bait and absorb the odor of the oil of anise. Then the hunter places the bee box on some stationary object within convenient view, and permits the bee to enter the top compartment by means of the attached slide. Then he withdraws the glass slide on top and permits the imprisoned bee to escape.

After circling about to orientate herself for the return trip, the released bee flies directly to her tree to unload. The course of her successive flights may be easily marked. Within a few minutes the released worker will return to the box, bringing other bees that have been attracted by the scent of anise oil. By sprinkling a pinch of flour on the back of a visiting bee and timing the interval between her visits, the approximate distance of the tree may be determined. It is estimated that a worker bee requires eight minutes for a round trip of half a mile.

If trouble is experienced in locating the tree, the visiting bees may be cross-lined by moving the box some distance away and trapping more bees. Where the two established lines of flight intersect, there will be your bee-tree.

Once the tree is found it is ordinarily felled, the hollow trunk or limb containing the bees split, and the honey removed. When their home is demolished and the honey removed, the bees soon settle nearby. They can be hived and moved as easily as a swarm of domestic bees. If they are disinclined to settle or become obstreperous, they may be subjugated by means of a smoker.

Sometimes, however, a bee-tree cannot be cut. The owner may register an objection. The location of the tree may render cutting it inadvisable, or its size may make it impracticable. In such cases the quickest procedure is to remove the limb in which the bees are holed up.

It may happen that neither of these methods may be followed. Bees may be in a trunk rather than a limb. Or they may set up squatters' sovereignty in a valuable shade tree that the owner does not wish mutilated. They may establish themselves in a tree in a public park, or in a private dwelling, or even in a church. What then? Can they be removed without damage to the premises?

They can, and with relatively little difficulty. Not only that, but the honey can be removed as well, without even "scratching the surface" of the premises. The secret is a simple and inexpensive little device known as a "bee-escape."

A few months ago a swarm of bees took an apartment in a tremendous live oak in a southern city. It was a magnificent tree, but admiring it close-up was not altogether to be recommended because of the venomous temper of the bees. The oak was, of course, untouchable. Mutilating even a part of it was out of the question. So harried park officials besought the services of a veteran bee-tree hunter.

A few weeks later the hunter had the colony of bees in his own backyard and a quantity of honey in his pantry, despite the fact that he had not even scratched the bark of the majestic tree.

The trick had been accomplished as follows: A light platform was erected under the hollow limb sheltering the colony of bees. On the platform, as near the flight-hole as possible, was placed a hive containing a nucleus, made by "stealing" two or three frames of bees along with a queen or queen cells, from another colony. Then the operator inserted in the flight-hole a bee-escape, a little one-way-street device that permits bees to come out but not to go in. Having so done, he left his apparatus to take care of itself.

As the bees emerged from their old home and found it impossible to re-enter, they gradually took up residence in the new hive occupied by the nucleus, to which they were a welcome addition. Within four weeks practically all the bees had deserted the old homestead, only the queen and a corporal's guard of retainers remaining in the tree. The operator then returned, removed the bee-escape, filled his smoker with sulphur and destroyed the queen and her retainers.

But what about the honey? The bees, with their customary frugality, took care of that. Once the queen had been destroyed and the bee escape removed, they proceeded to re-enter the former habitation and ransack its treasures, which they duly transported to the new hive.

Whenever a professional bee hunter finds a tree he wishes to take later, custom requires that he place his initials or a cross on the tree to signify priority. Common law originally entitled the marker of such a tree to possession of the bees. Some hunters, however, regarding such a sign as an invitation to unscrupulous prowlers, refrain from so advertising their finds. One shaggy old hunter of my acquaintance, who wouldn't know an ethic if he

APPLICATION FOR MEMBERSHIP
American Forests Is Sent Monthly to All Members

I enclose $..... for the class of membership checked below.

☐ Subscribing, per year ..... $4 ☐ Sustaining, per year.....$ 25
☐ Contributing, per year ..... 10 ☐ Life, no further dues..... 100

Name .....
Street Address .....
City ..... State .....
Fill in, tear out and return this application to 9-37

THE AMERICAN FORESTRY ASSOCIATION
919 SEVENTEENTH STREET, N. W. WASHINGTON, D. C.

met it in the middle of the road, follows the dubious practice of putting his initials on every likely-looking hollow tree he sees, whether it has bees or not. His explanation sounds plausible: "Got everything to gain and nothin' to lose. If bees ever take up thar, hit's my tree; if'n they don't, hain't no harm done."

The first question asked whenever the subject of bee-tree hunting comes up is: "Don't you get stung?" As a matter of fact, bees are fascinating and harmless insects. There is little occasion for being stung, provided you know how to handle bees. I once asked Sourwood Bill about being stung, and his answer was characteristic: "Now and then mebbe, but a feller's liable to git stung in any business these days."

POLLUTION

(*Continued from page* 452)

re-routed through a canal connecting the Chicago River with another small river and it finally reached the Mississippi a few miles above St. Louis. Chicago didn't want its own untreated sewage to clutter up Lake Michigan beaches and depreciate property values along its Gold Coast, but it was good enough for St. Louis. Considering the huge bulk of Chicago's domestic sewage, St. Louis was justified in becoming the plaintiff in the case, although the case was lost. Since then Chicago sewage conditions have improved, but nationally speaking the untreated sewage of more than 40,000,000 people in the United States is released in our streams. This, added to the industrial wastes, makes a staggering amount with which our rivers are unable to cope.

The indifference of industrialists toward our fish life, our recreational privileges and our national health is astounding, but their indifference to our mounting taxes is sheer impertinence. We pay for the expensive purifying plants which if overtaxed with wastes, cannot function properly; we pay in doctor bills, hospital bills and mortuary bills for the privilege of contracting water-borne diseases and minor ailments in order that a few manufacturers and unconscientious municipalities can dispose of their wastes in obsolete methods.

Sanitary engineers are agreed that the easiest method of waste disposal, that of dumping untreated refuse into our rivers, has become the most expensive to the taxpayer. The water supply of some of the larger cities is so polluted that they must seek new ones at a terrific expense. Pollution forced Albany, New York, to change its water supply at a cost of $7,000,000; no other supply being available, St. Louis must still use the Mississippi.

The remedy for this wholesale pollution is proper sewage treatment and treatment plants installed by cities and by industries. The expenditure would be in one lump sum instead of merely glossing over a menace that dare not continue. The cost of such equipment would be financed in part by federal aid and in some instances would eventually be found almost self-supporting.

Granted that we must be shod, that we must be clothed, that we must have our tabloids, the recalcitrant manufacturers of these articles must no longer be protected by the knavery of smart lawyers, the stupidity of city councilmen or the boondoggling of dishonest politicians; no longer be coddled, but cudgeled into efficient treatment of their wastes. The fact that some industries have removed the detrimental acids from their refuse proves that the recalcitrants could "go and do likewise" were they willing. Their favorite alibi, however, is that theirs is a special case and they know of no process that will take care of the poisons in their particular brand of trade wastes. Yet how quickly their chemists and engineers would solve the problem were it their own and not the public's.

The alibis of these industrialists, plus the monumental apathy of the public regarding stream pollution have all but thrown the fight for unpolluted waters into the discard; but behind the anti-pollution program are level-headed men, broad-minded enough to see all sides of the question and hard-headed enough eventually to get action, men who know that monied interests can defeat this program only as long as public apathy exists. Let the public and the press rise up against this evil and it will no longer be "the public be damned" but the public be served—by the Federal Government taking over complete responsibility.

Because a river is an agent of nature that ignores county, state, or national boundaries; that goes about its business of flowing from its source to the sea regardless of man-made geographical lines, its sewage problem should be treated as a whole from its source to its mouth and not bandied about by the separate cities and states through which it flows.

This the Federal Government alone can do because when one state in a river basin refuses to cooperate it nullifies the entire watershed program. With federal control not only would that one state be forced to co-operate so that the program could go through but henceforth no group of manufacturers or industrialists would be able to dictate to millions of United States citizens, making us drink water, swim in water and live by water that is polluted.

AERMOTOR
Forest Service Towers

Aermotor Towers are being used in constantly increasing numbers by our National and State Governments for the protection of our forests, and by large lumber companies for the preservation of timber.

They have, also, proved quite popular as observation towers at public resorts.

Designed for easy erection, they are protected for long life by special hot process galvanizing after all work of fabrication has been completed.

In **Aermotor Towers** utility, durability and pleasing design have been combined at surprisingly low cost.

Write for details

AERMOTOR CO.
2500 Roosevelt Road, Chicago, Ill.

Please Mention
AMERICAN FORESTS
When Writing to Advertisers

FOR OUTDOOR COMFORT

Ta-pat-co Sleeping Bags are as practical for Sleeping Porch, Cabin or Tent as they are for use right out in the open air. Bag illustrated is Style No. 57-A with waterproofed cover, 100% wool blanket lining. Amply filled with Kapok or virgin wool—the great insulating materials. Has tent top, pillow and extra foot pocket. Zipper seals you in. Price only $38.60. Ta-pat-co Sleeping Bags are used by U. S. Gov't Forest Rangers, Expeditions, Boy and Girl Scouts. Many styles from $8.60 to $44.75.

ESKIMO PARKAS: Great outdoor jackets with waterproofed duck coverings and 100% wool blanket linings. Gives warmth without weight. Hood protects head, neck and ears. Price $15.00.

Write for FREE descriptive folder on our complete outdoor line.

The American Pad and Textile Co.
Dept. 2K-9, Greenfield, Ohio, or
3 State St., New York City

Ta-pat-co TRADE MARK REGISTERED U.S. PAT. OFF. **SLEEPING BAGS**

GUESSING TIMBER COSTS MONEY

Measure the Amount of Timber on Your Southern Pine Woodland or Forest with a Specially Designed

LOG-SCALE STICK
and
TREE-SCALE STICK

With These Sticks

— You can quickly and accurately tell how much lumber in board feet your logs of any kind will saw out by careful saw-milling (the International Log Rule), also what they scale by the Doyle Rule.

— You can quickly and accurately tell how many 16-foot log cuts there are in standing trees.

— You can quickly and accurately estimate the contents in board feet (by the Doyle Rule or the more accurate International Rule) of standing trees of the Shortleaf, Longleaf, Slash or Loblolly Pines.

Each set consists of the two Timber Scale Sticks in a canvas container with a 16-page booklet giving complete instructions for use and other helpful information prepared by Mr. Wilbur R. Mattoon, Forest Service, U. S. Department of Agriculture.

Only $1.00 a set, Postpaid

Order direct from
THE AMERICAN FORESTRY ASSOCIATION
919 Seventeenth Street, N. W.
Washington, D. C.

AMERICAN FORESTS BINDERS

These binders, for filing your copies of AMERICAN FORESTS, hold twelve magazines and are fully guaranteed. Price $2.50 postpaid.

Send your order to:
THE AMERICAN FORESTRY ASSOCIATION
919 Seventeenth Street, N. W.,
Washington, D. C.

FORESTRY IN CONGRESS

By G. H. COLLINGWOOD

By signing with "much reluctance" the $132,732,000 Appropriation bill for the Department of the Interior on August 9, President Roosevelt made available $900,000 with which to start work on the Colorado-Big Thompson tunnel under Rocky Mountain National Park and made $21,631,380 available to the National Park Service. Of this total $3,425,100 is for the administration and development of the National Parks as generally recognized, $4,500,000 for the construction of roads and trails in the parks, and $6,000,000 for the Blue Ridge and Natchez Trace Parkways, of which $1,500,000 shall be spent for the Natchez Trace in Mississippi, Alabama, and Tennessee. The remainder is for the administration of public buildings, most of which are in the District of Columbia.

The President's reluctance in signing the bill was described in a special statement as applying to $14,483,000 which the Senate inserted for expanding the federal program of vocational education. It is significant, however, that the Bureau of the Budget called his attention to the large item for the Rocky Mountain tunnel and suggested that this also would be ample grounds for vetoing the bill.

The tunnel was the subject of a full hour debate on the floor of the House on July 26 and was decided by a roll call vote of 174 to 154. The need for economy and the fact that the $900,000 necessary for starting the tunnel had never been authorized by the Bureau of the Budget were the chief considerations, but Representative Everett M. Dirksen, of Illinois, described with vigor the need for defending the National Park ideals.

In correspondence with President McClure of The American Forestry Association, Senator Alva B. Adams, of Colorado, expressed the belief "that if the project is studied from a disinterested standpoint, no precedent will be found for commercialization or misuse of any National Park." He went further and stated, "It is highly desirable to provide for the abandonment of the diversion ditches of the Grand Ditch Company. They sadly scar some of the mountain slopes within the park. The water users' organization assure me that they will be very glad to have the proper exchange made by which water of the Grand Ditch Company would be carried through the tunnel and delivered more advantageously to the ditch company than is now done. * * * I can assure you that nothing will be permitted in the construction of this project to impair the beauties or attractiveness of the Rocky Mountain National Park."

No further action has been given S. 2681, specifically authorizing this project, since it was reported to the House on July 6.

The Grazing Administration of the Department of the Interior receives $800,000, an increase of $150,000 over last year's appropriation, while $420,000 is included for the administration and protection of the Indian Forests. These sums make a total of $15,145,100 for the conservation and development of naturally renewable resources in the Department of the Interior.

This sum, together with an item of $1,000,000 for flood control, included in the Appropriations for the civilian activities of the War Department, to be divided equally between the Departments of War and Agriculture, should be added to the $61,890,422 total for forestry and conservation reported in AMERICAN FORESTS for August. This brings the grand total to $78,035,522, exclusive of the $350,000,000 appropriated to the Civilian Conservation Corps.

With Congress working strenuously for adjournment before the end of August, Representative Whittington's H. R. 7646, to amend the Flood Control Act of 1936, authorizing the Corps of Army Engineers to construct public works for flood control on 132 rivers and creeks with their tributaries passed the Senate on August 5 and was sent to a conference committee. Originally designed to apply to the region above Cairo, Illinois, and including an authorization for $24,877,000, this becomes a measure of national importance.

On August 13, the President vetoed Senate Joint Resolution Fifty-Seven, on the ground that it conflicts with the principles of the Norris-Mansfield bills described in his message to Congress on June 3, 1937, and that the Corps of Army Engineers is not considered adequate to plan the comprehensible program for the development of the vast water and related resources of the nation which he contemplates.

The Norris-Mansfield bills would authorize the creation of seven great valley authorities after the manner of the Tennessee Valley Authority. They are meeting vigorous opposition on the ground that they would usurp state and local authority and give dangerous powers to politically appointed agencies. On August 9, Chairman J. J. Mansfield of the House Rivers and Harbors Committee, concluded hearings for the session, declaring that they will not be resumed until Congress convenes in January. Senate action has likewise been postponed because of the illness of Senator Norris.

Diversion of the excise tax of ten per cent on all sales of sporting arms and ammunition into a special Wildlife Restoration Fund is proposed in S. 2670 which passed the Senate on August 10. While imposing no new taxation, the bill would divert more than $3,000,000 derived from purchases by sportsmen, and will provide, in the words of Senator Bennett Champ Clark, "the needed impetus to bring about more quickly a restoration of wildlife species throughout the Nation in a manner somewhat similar to that which has brought about our wonderful system of state and national highways."

The Third Deficiency Appropriation may be reported to the House on August 16, in time for final action before Congress adjourns. It is understood that the Forest Service, supported by the Bureau of the Budget, has requested $1,000,000 to carry out the functions of the Norris-Doxey Act of May 18, 1937. Of this amount about $400,000 would be available for expanding the farm forestry extension work of the several land grant colleges and to the State Foresters for developing forestry practices and sustained yield on forest properties owned and operated for commercial purposes. The remainder would be devoted to the development of the Great Plains Shelterbelt.

CONSERVATION CALENDAR

Important bills in Congress with action from July 14 to August 12

BILLS ENACTED

H. J. Res. 431—MARTIN (Colorado)—Appropriating $1,000,000 to carry out the purposes of and for expenditures authorized under Public Resolution No. 20, approved April 6, 1937, for the control of incipient or emergency outbreaks of insect pests or plant diseases. Passed House July 13, 1937. Passed Senate July 15, 1937. Public Resolution No. 55.

H. R. 5472—WEAVER—To authorize the exchange of certain lands within the Great Smoky Mountains National Park for lands within the Cherokee Indian Reservation, North Carolina, and for other purposes. Passed House July 19, 1937. Passed Senate August 6, 1937. Signed by the Speaker and the Vice President August 9, 1937.

H. R. 6958—TAYLOR—Making appropriations for the Department of the Interior for the fiscal year ending June 30, 1938. Passed House May 20, 1937. Passed Senate amended June 28, 1937. Public Law No. 249.

S. J. Res. 57—MRS. CARAWAY (H. J. Res. 175—MCCLELLAN)—To authorize the submission to Congress of a comprehensive national plan for the prevention and control of floods of all the major rivers of the United States, etc. Passed Senate June 14, 1937. Passed House July 30, 1937. Presented to the President for approval and signature August 3, 1937.

H. R. 3866—SMITH, Washington (S. 559—SCHWELLENBACH)—To add certain lands to the Columbia National Forest in the State of Washington. Passed House July 19, 1937. Passed Senate August 7, 1937. Signed by the President August 12, 1937.

CONSERVATION

H. J. Res. 424—LUECKE—Authorizing an investigation of the fisheries and fishing industry of the Great Lakes by the United States Bureau of Fisheries. Introduced June 23, 1937. Referred to the Committee on Merchant Marine and Fisheries. Public hearing held July 22, 1937.

H. R. 7697—JONES—To promote conservation in the arid and semi-arid areas of the United States by aiding in the development of facilities for water storage and utilization, and for other purposes. Reported without amendment (Report No. 1450) by the House Committee on Agriculture August 6, 1937.

FORESTRY

H. R. 8100—DEROUEN—To provide a measure of damages for trespass involving timber and other forest products upon lands of the United States. Introduced August 2, 1937. Referred to the Committee on the Public Lands.

GOVERNMENT FUNCTIONS

S. 2700—ROBINSON—To provide for reorganizing agencies of the government, extending the classified civil service, establishing a General Auditing Office and a Department of Welfare, and for other purposes. Introduced June 23, 1937. Referred to the Select Committee on Government Organization. Public Hearings started August 2, 1937.

H. R. 8202—WARREN—To provide for the reorganization of agencies of the government, to establish the Department of Welfare and for other purposes. Introduced August 10, 1937. Reported without amendment (Report No. 1487) by the Select Committee on Government Organization.

INDIAN AFFAIRS

H. R. 8004—BERNARD—To provide an easement to the State of Minnesota over Indian lands in Cook County for rerouting Temporary Trunk Highway Sixty-one and a new crossing into Canada over the Pigeon River. Introduced July 26, 1937. Referred to the Committee on Indian Affairs.

LANDS

H. R. 7618—DEROUEN—Relating to the revested Oregon and California railroad and reconveyed Coos Bay Wagon Road grant lands situated in the State of Oregon. Passed House July 19, 1937. Referred to Senate Committee on Public Lands and Surveys July 20, 1937.

NATIONAL FORESTS

S. 2583—MCCARRON—To provide for the acquisition of certain lands for and the addition thereof to the Tahoe National Forest in Nevada. Passed Senate amended August 10, 1937.

NATIONAL PARKS AND MONUMENTS

S. 1075—SHIPSTEAD (H. R. 7952—KVALE)—To establish the Pipestone National Monument in Minnesota. Passed Senate August 6, 1937. Reported by Committee on Public Lands (Report No. 1509) August 12, 1937.

H. R. 7264—MURDOCK (Arizona)—To revise the boundary of the Grand Canyon National Park in Arizona; to abolish the Grand Canyon National Monument; to restore certain lands to the public domain. Reported without amendment (Report No. 1278) by the Committee on Public Lands July 21, 1937.

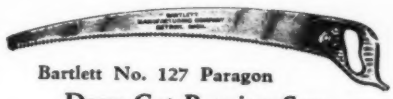
H. R. 7826—DEROUEN—To make available for national park purposes certain lands within the boundaries of the proposed Isle Royale National Park. Introduced July 12, 1937. Reported without amendment (Report No. 1280) by the Committee on the Public Lands July 21, 1937.

WATER AND STREAM CONTROL

H. R. 7646—WHITTINGTON—To amend an act entitled "An Act authorizing the construction of certain public works on rivers and harbors, for flood control, and for other purposes," approved June 22, 1936. Passed House July 19, 1937. Reported without amendment (Report No. 915) by the Senate Committee on Commerce July 22, 1937. Passed over in Senate August 6, 1937.

WILDLIFE

S. 2670—PITTMAN—To provide that the United States shall aid the states in wildlife-restoration projects, and for other purposes. Passed Senate August 10, 1937.



Bartlett No. 127 Paragon

Draw Cut Pruning Saw

Extra large hand hole, draw cut and considerable clearance. Popular with Linemen because easily handled and cuts fast. Highest grade steel, 22" or 24".

Tree Trimmers

Tree Trimmers, Lopping Shears, Saws, Tree Rod, Lag Hooks, Tree Paint, etc. We make a compound lever tree pruner in sections for telephone use. Easy to carry on service cars. Cuts 1¼-inch limb. Bakelite Insulated Trimmers for working around high voltage wires. Cut shows No. 1 Tree Trimmer Side Cutting Head, with a blade that will not fail and which assures a clean wound always.

BARTLETT MFG. CO.

Made Only in Detroit, Michigan

3019 EAST GRAND BOULEVARD

"Written for all whose interest in nature takes them out of doors."

Northern Rocky Mountain Trees and Shrubs

BY J. E. KIRKWOOD

Completely illustrated

Reduced from $7.50 to $2.50

Big Trees FRY AND WHITE

All about the Sequoias. $1.25

STANFORD UNIVERSITY PRESS

Stanford University, California

Trees for Forest Planting

PINE • SPRUCE

Firs, Arborvitaes and Other Conifers. We raise all our trees in our own nurseries.

KEENE FORESTRY ASSOCIATES

KEENE, NEW HAMPSSIRE

EVERGREENS, Deciduous Trees and Flowering Shrubs

in Large Quantities can be purchased from us More Reasonably than anywhere else (quality considered).

KELSEY NURSERY SERVICE

(Established 1878)

50 CHURCH ST. NEW YORK CITY

Peonies

TREE PEONIES, finest named blooming varieties. Herbaceous Peonies, best varieties. Oberlin Peony Gardens, Sinking Spring, Pa.

"An impressive, historical book."

AMERICAN CONSERVATION

In Picture and in Story

60th Anniversary Number of AMERICAN FORESTS

in Book Form, Revised and Cloth Bound

EDITED BY OVID BUTLER

$2.50 Postpaid

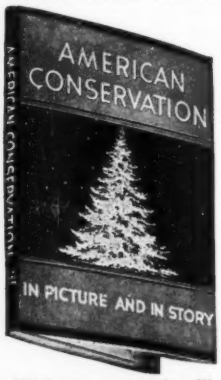
THIS volume presents a clear picture of America's organic natural resources, the part they have played in the development of the nation, the manner and consequences of their use, and the spread of the conservation movement from its beginning in the United States down to the present time.

Pictures Tell the Story

Very little to read in this big book because 216 pictures and brief paragraphs tell the story. Pictures are on every page; scenes of forests, wildlife, lumbering, conservation, etc.

Send For A Copy

This story has delighted thousands of men and women. It belongs permanently in every home library because it is a story every American should know. Send for your copy. Just fill in and mail the convenient order form below.



(fill in, tear out and mail)

The American Forestry Association,
919 - 17th St., N. W., Washington, D. C.

Send me ..... cop..... of AMERICAN CONSERVATION. I enclose $.....
($2.50 per copy postpaid).

Name .....

Street .....

City ..... *State* .....

FOREST GENETICS

(*Continued from page* 446)

be of practical significance in reforestation. Yet a short-cut method has been devised that makes it possible in a relatively few years to isolate from among the innumerable strains of a given species that nature has produced through countless generations, those with superior germ plasm—that is, those that have the inherent characteristics most desired by present-day planters.

The process used is known as a "Progeny Test" and it isolates these superior, these most vigorous strains as individual seed-trees in the forest, based on well-replicated nursery and plantation tests of their progenies. The very fact that timber trees are longer lived than agricultural crops is a distinct advantage, for it makes possible a long-continued supply of better seeds once the desirable seed-trees are found. Many of these superior trees that are being discovered as the investigations progress have been growing for a hundred years or more, and are capable of yielding for many decades heavy seed crops every few years. Even a single seed crop from one of these selected seed-trees will often be such that enough seed can be collected to produce from 5,000 to 20,000 superior seedlings. This illustrates the untold potentialities of these new genetical methods, and the comparatively short time required for them to yield results that have practical application to present-day reforestation.

Results so far seem to indicate that the easily obtained wind-pollinated seed is usually adequate for the various preliminary tests in which seed is gathered over wide areas, even though only one parent is thus known and controlled. However, as the investigations become localized in the areas that are found to contain the better trees, it may prove desirable to conduct some of the progeny tests with self-pollinated seed. Also, various tests of crossing the better individuals will be helpful in showing which combinations of parents will yield the best offspring.

As rapidly as relatively isolated plots of native trees containing a number of germinally superior individuals are found, it would seem that in preparing them to serve as future seed supply areas, it may be possible to improve the average vigor of the offspring from the best trees still further by cutting out, not only those that appear externally to be undesirable, but those trees that the progeny tests have shown to be inferior. Thus their pollen will be eliminated and henceforth natural cross pollination will take place largely between the hereditarily better types.

The application of this progeny test method over a wide range of seed sources has not only pointed out some of the best individual seed-trees in each locality, but it has also brought to light marked differences in the general character of the numerous local strains. In one such test with ponderosa pine the Institute compared side by side in a single nursery the progenies of 765 individual seed-trees growing in sixty counties in twelve western states and in British Columbia. The data gathered from this exhaustive study revealed the existence of numerous geographical races of this important timber species, each with distinct physical characteristics that will affect both the volume and quality of the lumber produced. One of the most significant and useful of the facts that these tests have revealed is that, in the Sierra Nevada of California, hereditary vigor has been found to be quite generally associated with the lower elevation of the seed source.

Although these and other findings here reported will, obviously, need checking by further experimentation, enough has been learned to demonstrate the tremendous practical possibilities that these methods offer to whoever will put them into use.

There probably will be no one best strain of any one species of pine for all timber-growing climates and soils where the species is to be used. Various superior strains will be needed, and as these are gradually developed and widely tested, they can be expected to exhibit some variation in the expression of their hereditary characters in different localities, depending on the local environmental conditions. Consequently, various field trials will be required to determine just which of the better strains are best adapted to each locality. In this way we will insure the maximum growth and the highest quality of lumber possible under each set of conditions.

From still another line of experimentation has come valuable new information that demonstrates the practicability of improving the strains of forest trees within a reasonable length of time. Many had thought that it would usually be necessary to wait until seedlings were fifteen to twenty years old or more before they would flower so that hybridization experiments could be conducted with artificially-grown trees. But tests in the Institute's nursery and arboretum have shown that many different species of conifers, particularly pines, flower at the early ages of two to five years.

Astonishing as it may seem, one Chinese species of pine, *Pinus sinensis*, actually blossomed profusely in the nursery at the age of one year from seed, thus causing pine breeding to approach, in some respects, the facility with which annual crops, such as wheat and corn, can be hybridized. As early as 1932 no less than forty-four species of forest trees were flowering in the Institute's arboretum, although the first plantings were made only six years before, and many of the trees were considerably younger than this. Among those that flowered at this early date were several two-year old seedlings of the Japanese red pine, *Pinus densiflora*, grown from seed collected in the arboretum. Not many species are quite as precocious as this, but the average age of initial flowering for pines has been found to be so low that cross pollination experiments can be conducted with them and tree generations can be secured much more rapidly than had been anticipated.

Another discovery offering much encouragement to the pine breeder is the great longevity of pine pollen. Simple and inexpensive methods have been found that will often keep this pollen viable for a year or more. This is in sharp contrast to the condition that exists in some other plants, such as corn, in which the pollen lives only about twenty-four hours, and if not used within that time is of no avail. The long life of pine pollen makes possible its shipment from the forests of distant countries for hybridization with native species and with others that may be flowering in the arboretum.

The possibility of hybridizing forest trees, and of actually combining in a single new hybrid form the desirable characters previously existing only in separate species, has been fully demonstrated in hybrids produced at the Institute, as well as in certain natural hybrids that have been discovered. The most outstanding of the Institute's artificial hybrids to date is a cross of the Knobcone pine, *Pinus attenuata*, a relatively slow-growing but hardy species, and the Monterey pine, *Pinus radiata*, a species which lacks hardiness but which is the fastest-growing of all species tested from forty countries. All of the hybrids have, very fortunately, inherited the cold-hardiness of the seed-parent and the rapid growth of the pollen-parent.

As one of the results of the study of artificially controlled pollination of pines it has been observed in experiments with several different species that when the flowers of a pine tree are pollinated with pollen from the same tree, the yield of seed tends to be abnormally low, and the germination of the seeds is usually comparatively poor. In addition, the resultant seedlings are often quite deficient in vigor, as compared with normal seedlings resulting from wind-pollination, which ordinarily seems to include much crossing with neighboring trees. These results may be taken as indications that, in all probability, many of the individual trees in the wilds are partially self-sterile and will yield vigorous offspring only when cross pollinated with pollen from other trees, usually of the same species.

Apparently pines behave much as do many of the crop plants, such as corn, that have been under tests by geneticists for decades. It is a common experience in plant breeding to find that there is a reduction in vigor following selfing or inbreeding, particularly in the first generation. One application of this finding in practical forestry is to avoid the collection of seeds from individual trees that are comparatively isolated, since such seeds are probably mostly self-pollinated. Also, in choosing seed-trees to be saved in logging operations the desirable practice, judging from present knowledge, would seem to be to leave them in small groups; or if left singly, the seed trees should be left close enough together to insure adequate cross pollination by the wind.

It is well recognized that hybrids between species often will not come true when reproduced by seed. Consequently the Institute has given some attention to the possibility of reproducing pines by budding and grafting, which are the usual commercial methods of propagating practically all orchard fruits and many ornamentals, in order to insure trueness to type. Though these methods of reproducing pines are still in the experimental stage, the preliminary tests of budding and grafting were quite successful, even when one species was budded onto another.

The more one studies genetics, the more thoroughly he becomes convinced of the widespread application of the fundamental laws of heredity, and the importance of giving thought today to the generations yet to come. The universality of these considerations may be appreciated by observing the close similarity in the situation that has long existed in forestry and in human society. When war is declared the best specimens of manhood are sought out and sent to the front, often never to return, while those that the examinations show to be unfit, are left at home to perpetuate the race.

With timber trees, too, this unfortunate practice has been all too prevalent of using the best for present needs and leaving the discards with their inferior heritage for the future—a tragic policy, bringing about the deterioration of the strains of our forest trees through what might well be termed "the perpetuation of the unfit." In some ways it may seem only natural that many have yielded to the pecuniary temptation to send to the mill all the finest and largest specimens, with straightest grain and the best form, leaving as seed-trees for natural regeneration only the misshapen, diseased and otherwise undesirable types that are not fit for lumber. In many cases the seed gathered for artificial reforestation has been little better, for all too often the collectors' chief concern has been ease of gathering, and hence much of the seed has come from low, scrubby or stunted trees.

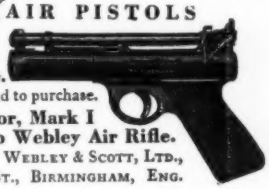
We know that not all of these poor-appearing trees have an inferior heredity, for those defects that are caused by environmental influences, such as mechanical injuries, are in no respect hereditary. Yet on the other hand, we also know that many visible characteristics that are undesirable economically, such as spiral grain and susceptibility to disease, and many others, are often definitely hereditary. It seems obvious, then, that any system of selection in which only the culls and poorest specimens are saved for reproduction must lead inevitably to the deterioration of the strain.

Another example of the unfortunate tendency to destroy the best, and one that is seldom appreciated, is afforded by the Institute's previously-mentioned discovery that the forms of ponderosa pine having the greatest inherent vigor seem to come from the low elevations in the Sierra of California. In this belt, at an elevation of only 900 feet above the sea, lies Coloma, where gold was discovered in 1848, starting an avalanche of adventurous prospectors to California. With surprising rapidity mining camps sprang up all along the foothills, and as this new western civilization developed, man unwittingly logged off great quantities of the easily-accessible low-altitude trees that we now find constitute a strain having exceptional growth capacities. This deforestation has been carried still farther by the fires that are so prevalent in this zone. At present there remain in this low elevation belt only scattered remnants of the extensive forests that existed prior to the advent of the white man. This slow but inevitable utilization and destruction of the relatively few remaining low-elevation trees of superior heredity is still going on, and so it behooves us to test as rapidly as possible the offspring of such of these trees as still exist. For, while nearly all the trees of this strain seem to yield relatively vigorous progenies, among them may be found one that surpasses all others—the progenitor of a new, rapid-growing race of Ponderosa pine that can be grown on very short rotations.

It is because forest genetics has often been regarded as an exceedingly slow and unpromising line of scientific endeavor that I have purposely summarized in this article some of the Institute's results that point strongly in the opposite direction. It is not the intention, however, to give the impression that the path of the tree breeder is strewn with thornless roses. His advances are always beset with difficulties, only a portion of which have as yet been overcome. Nevertheless, if we may be permitted to judge the future by the accomplishments of the past, the prospects from our present vantage point seem very bright for bringing about, through the use of genetics, some major advancements in American forestry.

"The Strongest Geared Power for Its Weight in the World"
Two Speeds
ALL STEEL HAND HOIST
SEATTLE U.S.A.

COMPACT
POWERFUL
SAFE
Positive Internal Brake
For Use Where Power Is Not Practical or Available
Two Ton "Lightweight"—Weight 60 lbs.
Five Ton "General Utility"—Wt. 110 lbs.
Fifteen Ton "Special"—Weight 680 lbs.
Positive internal brake—Two quickly shifted speeds—Adjustable length crank handle — Anti-friction babbitt bearings—Spring operated safety dog. Only eight parts. No keys or set screws to strip. Drum instantly free spooled for running out cable.
Complete descriptive literature and list of dealers in principal U. S. and foreign cities gladly mailed. Warehouse stocks for dealers supply—Seattle, Chicago, Brooklyn, Houston.
BEEBE BROS.
Incorporated
2728 6th Ave. S. Seattle, Wash.

WEBLEY AIR PISTOLS

Marvellously accurate for target practice.
No license required to purchase.
Models: Senior, Mark I & Junior, also Webley Air Rifle.
Write for List. WEBLEY & SCOTT, LTD., 173 WEAMAN ST., BIRMINGHAM, ENG.

Bargains in New and Used Glasses!

All makes, sizes and powers of nature, sport and hunting glasses, $6 upward. Telescopes, spotting and rifle scopes. Microscopes, magnifiers and compasses. Repair work and goods guaranteed. Catalog Free. Address Box H
J. ALDEN LORING, OWEGO, N.Y.

U. S ARMY SURPLUS STOCK
Brand New Live Leather Sling Straps, 1¼"..... $1.00
Used Sling Straps, good condition, 1¼"..... .45
Special 1¼" Swivels for above slings, pr..... .60
Good Used Carbine Leather Scabbards..... 1.95
New Mills Woven Cartridge Belts, 30/06 cal..... 1.00
30/06 Selected M. C. Ctges, 150 gr. per 100..... 2.25
30/06 Boattails, 1932 issue, 172 gr. per 100..... 3.50
30/06 Boattails, 1936 issue, 172 gr. per 100..... 4.50
Stamp for big cartridge list—Free New Catalog.
C-HUDSON SPORTING GOODS CO.
52 WARREN ST. NEW YORK CITY

USE the INDIAN FIRE PUMP FOR FOREST - GRASS - BRUSH FIRES
See D. B. SMITH Ad on Page 423

SPORTSMEN AND FAMILY
FISHING
EARLY, LATE AND BEST FISHING
Best Va. Cooking — 1200 ft. Verandas — Rockers
June, July, Sept., Oct., Channel Bass.
June to Nov., almost all Salt Varieties.
A. H. G. Mears, Owner, Hotel Wachapreague
Wachapreague, Eastern Shore, Va.
Booklets. Ref., Sportsmen, Families Everywhere

Index to

ADVERTISERS

September, 1937

	PAGE
Aermotor Company	463
Allis-Chalmers Manufacturing Company (Tractor Division)	455
American Fork and Hoe Company	459
American Pad and Textile Company	463
American Telephone and Telegraph Company	2nd Cover
Atlas Powder Company	457
Bartlett Manufacturing Company	465
Beebe Brothers	467
Caterpillar Tractor Company, The	453
Cleveland Tractor Company, The	4th Cover
Fechheimer Brothers Company, The	462
Herbst Brothers	457
Hudson Sporting Goods Company	467
Idaho School of Forestry	460
Ingersoll Steel & Disc Company	422
Jaeger Machine Company, The	461
Keene Forestry Associates	465
Kelsey Nursery Service	460-465
Loring, J. Alden	467
Maine School of Forestry	461
Mears, A. H. G.	467
Natural Bridge of Virginia, Inc.	462
Oberlin Peony Gardens	465
Pacific Marine Supply Company	3rd Cover
Smith & Company, D. B.	423-462-467
Stanford University Press	465
Warren Axe and Tool Company	461
Webley & Scott, Ltd.	467
Wilson Company, Al	462

WHO'S WHO

Among the Authors in this Issue

M. E. MUSGRAVE (*White Magic in Navajo Land*), formerly with the Biological Survey, is in charge of soil conservation research in the Southwest for the Soil Conservation Service and lives at Albuquerque, New Mexico.

M. E. Musgrave

An important phase of his background lies in his ownership and operation of land management units — farms and ranches on which he has for years carried on experiments in plant and animal life. He is convinced that the best possible way of preventing land wastage on the ranges of the West is to return them to natural conditions where as nearly as possible a biological balance is maintained, all the way up the line from micro-organisms of the soil to the human race. When the Mexican Springs Experiment Station was established and he took charge, he worked for the return of the natural conditions that had existed in the Navajo country during prehistoric days when flood irrigation farming was practiced and the rougher areas were used for grazing animals, wild or domestic. Read here the story of the results obtained when the "white magic" was put practically to work in "Navajo Land."

STEWART HOLBROOK (*Camp Watching*), of Portland, Oregon—well known raconteur and writer of popular current fact and fiction, here tells a story of a little known phase of the logging camp—that of the "watcher" left to guard the empty camp when the job is done, and his reactions as he sees the crew pull off and hears the last whistle of the locomotive die away.

BLYE ENGLIS (*Pollution—Too Bad To Be True*) lives at Portland, Oregon, and has been engaged in nature work since 1915. Pollution is under attack, and from many angles, as it should be. Robert W. Chambers, world famous American author, who was as well an ardent conservationist, once wrote: "Hell is a treeless desert, set with the dead bones of murdered rivers" and Miss Englis writes with conviction in the same strain. Her fresh viewpoint gives startling vividness to the stark reality of the pollution menace. She calls it Public Enemy No. 1, threatening the nation.

Blye Englis

BEN EAST (*A Shrine Is Safe*) is a seasoned outdoor editor and a writer of fiction. Native of Michigan, Mr. East has devoted his pen to her service in his capacity as nature editor for a group of papers. Here he tells of the preservation of the shrine of Hiawatha in the heart of the Michigan wilderness, and how the shadowy threat of its destruction has at last been removed and this project, long only a dream, is now reality. No highways will traverse this forest of Hiawatha by "the Shining-Big-Sea-Water." It shall remain unspoiled in its wild setting, home of Hiawatha's "brothers" and the little people of the forest, a beauty spot preserved by Michigan as one of her State Parks.

LLOYD AUSTIN (*Forest Genetics*) has made the study of plant breeding his life work. Graduating in 1920 from the University of California, he was an intimate friend of Luther Burbank, outstanding pioneer in practical plant breeding. Mr. Austin tells of the remarkable results being attained in the production of inherently superior rapid-growing strains of forest trees—just as science has developed in agriculture superior types of farm crops, orchard fruits and even domestic animals. The feasibility of using the science of forest genetics in improving forest tree strains to meet today's demand and that of the future, is clearly shown in this summary of the first ten years' work at a pioneer research institution in California.

Lloyd Austin

HAVILAH BABCOCK (*Hunting Bee Trees*) is Head of the Division of Literature at the University of South Carolina. He is an ardent gardener, bird-dog fancier and a regular contributor of outdoor stories to national magazines. Born at Appomattox, Virginia, he lives at Columbia, where he says they have hives of bees IN their house and on the porches! Strange as it may seem, this business of bee hunting is a favorite outdoor pastime with thousands of Americans. Dr. Babcock, for years an enthusiastic student of the busy bee, has a close follower in his young son "Huck Finn" (his real name), whose picture is shown in the story with a fine "catch" of wild honey.

Havilah Babcock

G. H. COLLINGWOOD (*Mountain Hemlock*) is Forester of The American Forestry Association.

THE COVER—"Pine Vista"—in Acadia National Park, Mt. Desert Island, Maine, is a photograph from the "coast to coast" collection of Devereux Butcher.

Even a BLOWTORCH Couldn't Burn It!

The picture at the right graphically portrays an unsuccessful attempt to burn Pacific Pacolized Linen Forestry Hose, when water was being pumped through it. The small seepage through this hose makes it possible to lay it right through a fire line, without danger of the hose bursting. This is but one of the many outstanding features of Pacific Pacolized Linen Forestry Hose.

Actual photos of attempt to burn PACIFIC PACOLIZED LINEN FORESTRY HOSE, taken June 12, 1937.

The start—note black soot mark as flame hit hose before water started through hose.

Pumping for hotter flame—no indication of burning yet.

Five minutes later—giving it up as a bad job—no damage yet.

Examining hose fabric—as good as new under soot. No damage noted, and later inspection under magnifying glass showed fabric same as new.

Ideal Forestry Hose

By every standard, Pacific Pacolized Linen Forestry Hose is ideal for your purposes. Pacolizing, an exclusive, patented process gives linen hose these extra features.

LIGHTER

One man can carry two to three times as much Pacific Pacolized Linen Forestry Hose as he can of any other type.

MILDEW PROOF

You never have to worry about mildew with Pacific Pacolized Linen Forestry Hose. Pacolizing impregnates the fibers with a special preparation, making the hose immune from mildew.

ROT RESISTANT

This same Pacolizing process renders Pacific Linen Hose immune from rot, with ordinary care.

HIGH BURSTING POINT

Pacolizing strengthens the linen fibers, making this hose stronger and more durable. This hose will stand any pressure developed by modern portable pumpers.

FLEXIBLE

Unlike untreated linen hose, Pacific Pacolized Linen Forestry Hose is flexible and can easily be rolled compactly, even when wet.

★ ★ ★

Send for a sample and complete details.

PACIFIC MARINE SUPPLY CO. Pacolized LINEN FORESTRY HOSE

Fire Fighting Equipment Division

PACIFIC MARINE SUPPLY CO.

SEATTLE, WASHINGTON

Manufacturers of the Famous PACIFIC PUMPERS

PACIFIC MARINE SUPPLY CO.
SEATTLE, WASHINGTON

Gentlemen:

Please send me a sample of Pacific Pacolized Linen Forestry Hose, with complete details and prices.

Name .....

Address .....

City ..... *State* .....

ALASKA

the land you plan to visit

VISIT ALASKA. See the work of the National Forest Service in Region No. 10 with its two national forests — Tongass and the Chugach — and you will see Cletracs at work — as elsewhere in National Forest service.

Here on lofty plateaus and in deep valleys Cletracs play an important part in the work of opening roads and trails through 20,000,000 acres of forest so that travelers can see the wonders of this region.

Snow, mud, rocks, steep hills — all kinds of rough going present no obstacles to Cletrac because *dependability* and *power* are built into every Cletrac. This is why several thousand Cletracs are used by the U. S. Forest Service.

THE CLEVELAND TRACTOR CO. - - CLEVELAND, OHIO

Grading with a Cletrac on a Forest Service Recreational area, Southeastern Alaska.

To see the wonders of trees like this the Forest Service builds roads like this with Cletracs.

CLETRAC CRAWLER TRACTORS

The only tractors with controlled differential steering that keeps both tracks pulling at all times . . . on the turn as well as on the straightaway.

a

to

in
he
in

ant
res

no
nto
the

10

vice
ska.

S